

**HEALTH AND SAFETY PLAN  
ELLSWORTH INDUSTRIAL PARK SITE  
DOWNERS GROVE, ILLINOIS**

**WORK ASSIGNMENT NO. 251-RICO-B52A  
REVISION 0 - 2 OCTOBER 2006**

**Prepared for**

**U.S. EPA Contract No. 68-W7-0026  
U.S. Environmental Protection Agency  
77 West Jackson Boulevard  
Chicago, Illinois 60604**

**Document Control No. RFW251-2D-AWBH**

**EPA Region 5 Records Ctr.**



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3 October 2006

Mr. Mazin Enwiya  
Work Assignment Manager  
U.S. Environmental Protection Agency  
77 West Jackson Boulevard  
Chicago, Illinois 60604

U.S. EPA Contract No.: 68-W7-0026  
Work Assignment No.: 251-RICO-B52A  
Document Control No.: RFW251-2D-AWBH

Subject: Health and Safety Plan  
Ellsworth Industrial Park  
Downers Grove, Illinois

Dear Mr. Enwiya:

Weston Solutions, Inc. (WESTON®) is pleased to submit for U.S. EPA's review, three copies of the Health and Safety Plan (HASP), Revision 0 for the Ellsworth Industrial Park Site in Downers Grove, Illinois.

Should you have any questions or require additional information, please feel free to contact us.

Very truly yours,

WESTON SOLUTIONS, INC.

Joseph M. Ruiz  
Site Manager

Enclosure

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## **SITE HEALTH AND SAFETY PLAN (HASP)**

Office: Chicago, Illinois  
Site Name: Ellsworth Industrial Park Site  
Client: United States Environmental Protection Agency  
Work Location: Downers Grove, Illinois  
WO#: 20064.251.100.0132

SITE HEALTH & SAFETY PLAN (HASP)																												
Prepared by: Trenna Sundquist		W.O. Number: 20064.251.100.0132	Date: 9-18-06																									
<b>Project Identification</b> Office: CHI Site Name: Ellsworth Industrial Park Site Client: U.S. EPA-RAC Work Location Address: OU1 Ellsworth Industrial Park Site- Study Areas A through K; 2500 Curtiss Street; Curtiss and Glenview Intersection; Shopping Mall Parking Lot 63 <sup>rd</sup> Street between Belmont and Woodward; I-355 and 63 <sup>rd</sup> Street Intersection; Hanson Road between Lee Street and Springside Avenue; Pershing Road between 59 <sup>th</sup> Street and Maple Avenue; Downers Grove, Illinois		<b>Site History:</b> SEE NEXT PAGE FOR SITE HISTORY																										
<b>Scope of Work:</b> This HASP will cover the Remedial Action (RA). The RA will involve site reconnaissance (utility corridor survey and sub-slab monitoring); geological investigation (soil sampling); hydrogeological investigation (groundwater monitoring, groundwater surveying, and hydraulic testing); human health risk assessment; and ecological risk assessment.																												
<input type="checkbox"/> Site visit only; site HASP not necessary. List personnel here and sign off below:																												
<b>Site regulatory status:</b> <table border="0" style="width: 100%;"> <tr> <td><b>CERCLA/SARA</b></td> <td><b>RCRA</b></td> <td><b>Other Federal Agency</b></td> </tr> <tr> <td><input checked="" type="checkbox"/> U.S. EPA</td> <td><input type="checkbox"/> U.S. EPA</td> <td><input type="checkbox"/> DOE</td> </tr> <tr> <td><input checked="" type="checkbox"/> State</td> <td><input type="checkbox"/> State</td> <td><input type="checkbox"/> USACE</td> </tr> <tr> <td><input type="checkbox"/> NPL Site</td> <td><b>NRC</b></td> <td><input type="checkbox"/> Air Force</td> </tr> <tr> <td><input checked="" type="checkbox"/> OSHA</td> <td><input type="checkbox"/> 10 CFR 20</td> <td><input type="checkbox"/> _____</td> </tr> </table> Hazard Communication (Req'd See Attachment D) <input checked="" type="checkbox"/> 1910 <input checked="" type="checkbox"/> 1926 <input type="checkbox"/> State		<b>CERCLA/SARA</b>	<b>RCRA</b>	<b>Other Federal Agency</b>	<input checked="" type="checkbox"/> U.S. EPA	<input type="checkbox"/> U.S. EPA	<input type="checkbox"/> DOE	<input checked="" type="checkbox"/> State	<input type="checkbox"/> State	<input type="checkbox"/> USACE	<input type="checkbox"/> NPL Site	<b>NRC</b>	<input type="checkbox"/> Air Force	<input checked="" type="checkbox"/> OSHA	<input type="checkbox"/> 10 CFR 20	<input type="checkbox"/> _____	<b>Safety Officer Manual (Required to be On-Site)</b> Based on the Hazard Assessment and Regulatory Status, determine the Standard HASP(s) applicable to this project. Indicate below which Standard HASP will be used and append the appropriate pages of this form along with the Standard Plan <table border="0" style="width: 100%;"> <tr> <td><input type="checkbox"/> Stack Test</td> <td><input type="checkbox"/> _____</td> </tr> <tr> <td><input type="checkbox"/> Air Emissions</td> <td><input type="checkbox"/> _____</td> </tr> <tr> <td><input type="checkbox"/> Asbestos</td> <td><input type="checkbox"/> _____</td> </tr> <tr> <td><input type="checkbox"/> Industrial Hygiene</td> <td><input type="checkbox"/> _____</td> </tr> <tr> <td><input type="checkbox"/> Other</td> <td><input type="checkbox"/> _____</td> </tr> </table>		<input type="checkbox"/> Stack Test	<input type="checkbox"/> _____	<input type="checkbox"/> Air Emissions	<input type="checkbox"/> _____	<input type="checkbox"/> Asbestos	<input type="checkbox"/> _____	<input type="checkbox"/> Industrial Hygiene	<input type="checkbox"/> _____	<input type="checkbox"/> Other	<input type="checkbox"/> _____
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SO/DSM/CHS	Tonya Balla	Signature																										
	Name (Print)																											
Other		Date: _____																										
	Name (Print)	Signature																										
Approved by:		Date: _____																										
Project Manager	Joseph M. Ruiz	Signature																										
	Name (Print)																											
<b>Hazard Assessment and Equipment Selection</b>																												
In accordance with WESTON's Personal Protective Equipment Program and 29 CFR 1910.132, at the site prior to personnel beginning work, the SHSC and/or the Site Manager have evaluated conditions and verified that the personal protective equipment selection outlined within this HASP is appropriate for the hazards known or expected to exist. (Refer to Safety Officer Manual Section 2, Personal Protection Program, for guidance.)																												
<input checked="" type="checkbox"/> FSO																												
<input type="checkbox"/> Site Manager		Date: _____																										
	Barry Crawford	Signature																										
	Name																											
<input type="checkbox"/> Environmental Compliance Officer																												
<input checked="" type="checkbox"/> Dangerous Goods Shipping Coordinator		Barry Crawford																										
	Name	Signature																										
Project start date: Sept 26, 2006	This site HASP must be reissued/reapproved for any activities conducted after:	Amendment date(s)	By:																									
End date: Jan 2006		1. _____																										
		2. _____																										



	Date: March 1, 2006	3. 4. 5.	
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<b>Vehicle Use Assessment and Selection</b>	
<p>Driving is one of the most hazardous and frequent activities for WESTON Employees. The most appropriate type vehicle(s) authorized for use on this project is/are:</p> <ol style="list-style-type: none"> <li>1. Sport Utility Vehicle</li> <li>2. Pick-up Truck</li> <li>3.</li> <li>4.</li> </ol>	
<p>The following Project Team Member's qualifications and experience in driving these types of vehicles was evaluated and found to be acceptable (indicate vehicle type(s) number next to employee name).</p> <ol style="list-style-type: none"> <li>1. TBD</li> <li>2. TBD</li> <li>3.</li> <li>4.</li> <li>5.</li> <li>6.</li> <li>7.</li> <li>8.</li> <li>9.</li> <li>10.</li> </ol>	
<p>The project site was evaluated and a <b>Traffic Control Plan</b> <input type="checkbox"/> is required <input checked="" type="checkbox"/> is not required.</p>	
<p>If required, the <b>Traffic Control Plan</b> can be found in Attachment H.</p>	

## SITE HISTORY

The Ellsworth Industrial Park (Ellsworth) Site is located in Downers Grove, DuPage County, Illinois. The approximate boundaries of the overall site are Burlington Avenue to the north, 63<sup>rd</sup> Street to the south, Lee and Springside Avenues to the east, and Interstate 355 (I-355) to the west. The overall site has been further subdivided by the U.S. EPA into Operable Unit 1 (OU1) and Operable Unit (OU2). This HASP is specific to OU1, which consists of the industrial park proper. OU2 consists of the groundwater contamination areas detected in the residential areas outside (south and west) of the Ellsworth Industrial Park. OU1 consists primarily of commercial/light industrial properties, and OU2 consists primarily of residential, recreational, and commercial properties. OU1 is bordered on the north by Burlington Avenue; on the south by Elmore and Inverness Avenues; on the east by Belmont Avenue; and on the west by I-355.

The Ellsworth Industrial Park was built in the late 1950's and currently consists of approximately 135 businesses. Surrounding properties encompass residential, recreational, and commercial/light industrial properties. The businesses that currently occupy the industrial park and the surrounding areas perform a broad range of activities.

A number of past investigations have been conducted at and surrounding the Ellsworth Industrial Park by Federal, State, Municipal, and private property owners.

### **Initial Residential Well Sampling**

Between Spring and Fall 2001, the IEPA performed residential water well sampling on the east side of I-355 near Downers Grove in response to citizen concerns related to private-well sampling in neighboring Lisle. The investigation consisted of three rounds of residential-well sampling throughout the area. Approximately 495 private wells were sampled and analyzed for levels of VOCs. Sample results indicated elevated levels of perchloroethylene (PCE), trichloroethylene (TCE), and other related VOCs. Approximately 52% of the samples collected during Round 1 and Round 2 contained PCE or TCE above 5 micrograms per liter (µg/L) or parts per billion (ppb) (the federal drinking-water standard and the State of Illinois Maximum Contamination Limit [MCL]). The results of this investigation identified a chlorinated solvent plume within the bedrock aquifer.

### **Subsurface Groundwater Investigation**

In response to initial residential-well water sampling, IEPA performed a cone penetration test (CPT) investigation within the Ellsworth Industrial Park. The results of this investigation are contained in the *Subsurface Groundwater Investigation Report, Ellsworth Industrial Park* (Parsons, 2001). The investigation used a CPT rig to log the overburden lithology in the area and collect groundwater samples at a variety of depths above the bedrock in order to evaluate potential source area(s) of chlorinated solvent releases. The area of investigation included only the southern and southeastern-most portions of the industrial park along portions of Wisconsin, Elmore, and Inverness Avenues. Groundwater samples were collected using the CPT sampler and by the installation of temporary 3/4-inch polyvinyl chloride (PVC) piezometers. During the investigation, 28 groundwater samples were collected from 27 separate sampling locations within the industrial park. Of the 28 groundwater samples, one sample was found to contain TCE above the method detection limit.

### **Phase I Site Assessment**

In February 2002, the U.S. EPA and the IEPA conducted additional joint-effort groundwater investigations within and outside the industrial park to further evaluate the presence of chlorinated solvent groundwater contamination and narrow down potential source areas. The results of this investigation were documented in the *Final Preliminary Groundwater Investigation Report* (Weston, 2002), and has been heretofore referred to as the Phase I Site Assessment (SA). During this study, the IEPA conducted boring and sampling activities using a Geoprobe unit outfitted with a membrane interface probe (MIP) for soil logging and sample collection. The U.S. EPA performed a follow-up CPT investigation throughout the industrial park and selected areas east of the park. The CPT rig was used to advance stratigraphy borings, which aided in evaluating the geology at each location, as well as identified the presence of water-bearing zones within the unconsolidated overburden soil. Each boring was advanced to refusal, which ranged from approximately 12 to 80 feet below ground surface (bgs). A total of 44 locations were advanced using the CPT and Geoprobe MIP technology. Once the stratigraphy was characterized and the water-bearing zones were identified, depth intervals were selected for groundwater sampling. A total of 37 investigative groundwater samples were collected. Chlorinated constituents, including 1,1,1-trichloroethane (TCA), tetrachloroethylene (PCE), trichloroethylene (TCE), and their common degradation products, were detected at several locations and at various concentrations within the industrial park. The highest concentrations were generally found to be present along Curtiss Street between Chase Street and Katrine Avenue. The presence of TCE and PCE in shallow groundwater provided a potential link between source(s) in the industrial park and contamination observed in residential wells downgradient of the Site.

### **Phase II Site Assessment**

Based on the results of the previous groundwater investigations, a Phase II SA was undertaken as a joint effort between the U.S. EPA and the IEPA to further characterize chlorinated solvent contamination in soil and groundwater and identify potential source properties. The results of this investigation were documented in the

*Phase II Site Assessment Report* (Weston, 2002). Prior to field investigation activities, efforts were undertaken to gather and evaluate existing data and information on properties and businesses within the industrial park. This information was used to focus field investigative efforts on potential chlorinated solvent source areas based on past and present use of these chemicals. In addition to focused investigations at specific facilities, a network of groundwater monitoring wells was also installed throughout the industrial park to begin evaluating site hydrogeologic characteristics. During the investigation, 21 soil borings were advanced, along with the installation of 25 overburden and 17 bedrock monitoring wells.

The results of the Phase II SA indicated that PCE and TCE, and their degradation products, were present at numerous and widespread locations and depths within the Ellsworth Industrial Park in soil at concentrations up to 500,000 micrograms per kilogram (ug/kg). PCE and TCE were also detected in groundwater in both glacial drift and bedrock aquifers at concentrations up to 190 ug/L. By comparison, the highest PCE/TCE concentrations observed in residential wells south of the Site were typically around 15 ug/L. The compound 1,1,1-TCA was also found at significant concentrations. The data indicated that chlorinated solvent constituents appear likely to be migrating from sources within the industrial park through overburden soil, entering the bedrock aquifer system, and migrating in a downgradient direction towards the affected residences.

#### **Supplemental Investigation**

A Supplemental Investigation was undertaken by the U.S. EPA to further investigate 27 additional properties within and outside of Ellsworth Industrial Park boundaries to identify properties that may have contributed to the groundwater contamination detected in the industrial park and residential areas south of the industrial park. The results of this investigation were documented in the *Data Evaluation Summary Report* (Weston, 2004). The scope of work included borehole logging and soil and groundwater sampling. Work was performed at targeted businesses or sites selected by the U.S. EPA based on historical data and information. During the investigation, a total of 118 soil borings were advanced, and 67 groundwater samples were collected. PCE, TCE, and their common breakdown products were detected in shallow soil during this investigation at concentrations up to 35,000 ug/kg, and in shallow groundwater at up to 340 ug/L.

#### **Records Review Activities**

Throughout the Ellsworth Industrial Park investigation process, the U.S. EPA and the IEPA have evaluated available documents and records from numerous properties and businesses within and around the industrial park to identify current and previous users of chlorinated-solvent products. In October 2001, the IEPA sent out information-request letters to approximately 21 facilities that had been identified during their initial door-to-door survey of the Ellsworth Industrial Park as using chlorinated cleaners/solvents or other types of chlorinated materials. The information IEPA requested pertained to the Site activities related to the purchasing, receiving, processing, storing, treating, disposing, or otherwise handling of hazardous substances. The U.S. EPA issued supplemental information requests and reviewed this information supplied to the U.S. EPA and the IEPA, along with available records from the U.S. EPA Records Center in order to develop a list of facilities in the industrial park identified as using chlorinated solvents. The U.S. EPA has, and will continue the process of gathering and evaluating background data and information into the RI/FS stage.

#### **Investigations Conducted by Others**

Several additional investigations have been conducted by others either as part of investigations related to the Ellsworth Industrial Park groundwater contamination issues, or investigations conducted by individual property owners within Ellsworth Industrial Park as part of due diligence activities. Investigations for which subsurface testing activities took place and records were available are summarized in the following subsections.

#### **Wastewater Treatment Plant Sewage Lagoon Area Studies**

An investigation was conducted at the Downers Grove Sanitary District's (DGSD) Sewage Lagoon Area in the Fall of 2002 (Huff & Huff, Inc., 2002). This investigation consisted of two soil borings advanced through the existing sludge in the DGSD west and east lagoons; and the installation of five additional monitoring wells on their property adjacent to the lagoons. Sludge/soil samples were collected and analyzed from each of the two soil borings and groundwater samples were collected from the five newly installed wells and three existing monitoring wells. The sludge/soil and groundwater samples were analyzed for VOCs. VOCs were not detected in lagoon sludge/soil samples. VOCs were detected in groundwater confirming the presence of TCE up to 9 ug/L in U.S. EPA monitoring well BD(41) on the DGSD property. Additional VOCs including 1,1,1-TCA, 1,1-DCA, chloroethane, and vinyl chloride were detected in two of the newly installed monitoring wells. Based on groundwater flow directions presented, this report concluded that the presence of VOCs in groundwater was due to an off-site source.

#### Chase-Belmont Properties Subsurface Soil Investigation

An investigation was conducted in January 2003 on the five buildings addressed as 5000-5111 Chase Avenue, Downers Grove, Illinois (EarthTech, 2003). A total of 16 geoprobe soil borings were advanced during this investigation at depths ranging from 16 to 20 ft bgs. Sixteen soil samples and four water samples were collected during this investigation at various locations around the buildings and analyzed for VOCs. PCE was detected in shallow soil at concentrations up to 165 ug/Kg. PCE and TCE were detected in shallow groundwater samples at concentrations up to 23 ug/L and 10 ug/L, respectively.

#### U.S. EPA Hydrogeologic Investigations 2003 and 2004

The U.S. EPA conducted additional hydrogeologic characterization in 2003 and 2004 in the vicinity of the Ellsworth Industrial park. Activities were conducted in what is currently designated OU1, as well as in OU2. Investigation activities consisted of geophysical logging in select residential water supply wells, and water level monitoring throughout the OU1 and OU2 areas. These investigations concluded that wells open to the drift aquifer indicate downward vertical groundwater flow but no consistent horizontal groundwater flow direction. Groundwater flow directions in the bedrock aquifer are predominantly from northwest to southeast and do not appear to have been altered by the cessation of pumping from residential water wells as they were abandoned or decommissioned due to municipal water supply hookup. Geophysical logging indicated that fractures in the dolomite bedrock tend to be concentrated at certain elevations, but elevation patterns were not evident.

#### Due Diligence and Hydrogeologic Investigations - 2537 Curtiss Street Property

A number of investigations have been conducted at the 2537 Curtiss Street property beginning with a Phase I Environmental Site Assessment (ESA) in November 2000 (Environmental Group Services, Ltd., 2000). The Phase I ESA indicated that chlorinated solvents had been used at the facility and staining and solvent odors were present within expansion joints of the concrete foundation. Based on these results, a Phase II investigation was conducted (Environmental Group Services, Ltd., July 2001). During this investigation, three soil borings were advanced below the concrete foundation within the building. Soil samples were collected and analyzed for VOCs and only minor compound detections were observed. An expanded Phase II investigation was also conducted (Environmental Group Services, Ltd., September 2001) in which additional borings were advanced within the building foundation footprint. PCE was detected in two soil samples ranging from 14 to 33 ug/kg. 1,1,1-TCA was also detected. Based on these results, two additional investigations were carried out to investigate the hydrogeologic characteristics of the Site and determine whether chlorinated solvents were present in shallow groundwater. The results of these investigations were summarized in two reports (Environmental Group Services, Ltd., December 2001, and January 2002). Ten shallow monitoring wells were installed on-site, and soil and groundwater samples were collected. These hydrogeologic investigations concluded that the shallow subsurface geology is variable and consists primarily of tills interbedded with saturated silt, sand, and gravel layers. Shallow groundwater is contained within these seams and layers at depths between 13 and 30 feet bgs; however, several wells were also observed to be dry, indicating a perched groundwater system was likely present at shallow depths. PCE, TCE, and 1,1,1-TCA were detected in subsurface soil at concentrations up to 119 ug/kg, 6.6 ug/kg, and 61.6 ug/kg, respectively. PCE and TCE were also found to be present in groundwater samples from the shallow monitoring wells at concentrations up to 140 ug/L and 8.5 ug/L, respectively. PCE/TCE daughter products were also observed at low levels.

#### Focused Site Investigation - 2659 Wisconsin Avenue Property

Focused Site characterization activities were conducted as part of a remedial action conducted at the 2659 Wisconsin Avenue property (Pioneer Environmental, Inc, 2000 and 2001). Background information indicates chlorinated solvents were used at this facility and a release was documented through a floor drain which impacted soil in a small area on the east side of the building. PCE, TCE, and their daughter products were detected in subsurface soil in this area based on soil boring and sample collection. These reports indicate that the nature and extent of chlorinated solvent contamination was delineated and performed subsequent risk analyses in accordance with the IEPA regulations. Groundwater was not encountered during the focused investigations.

#### Phase II Site Investigations - 2525 Curtiss Street Property

A Phase I ESA was conducted at the 2525 Curtiss Street property in July 2000 (Caddis, Inc., July 2000). The Phase I ESA indicated that various hazardous substances, including chlorinated solvents, were handled at the facility, and recommended subsequent sampling take place. Based on this recommendation, a Phase II Site Investigation was conducted (Caddis, Inc., August 2000). Information contained in this report indicated a 2,000 gallon waste solvent UST was removed from the Site in 1988. Ten soil borings were conducted at locations around the facility. PCE was detected from all soil samples collected exterior to the south side of the building at concentrations up to 238 ug/kg. Metals and PCBs were not detected above background levels and PCBs were not detected above laboratory detection limits. A Supplemental Phase II Investigation was conducted the following year (Caddis, Inc., October 2001). Eleven additional soil borings were advanced on the south, east, and west sides of the property. PCE was detected in four of the 11 soil borings at concentrations ranging from 71.3 ug/kg to 350 ug/kg. TCE was also detected at 41.2 ug/kg. DCE and 1,1,1-TCA were also detected in soil during this investigation.

UST Corrective Action Completion Report - 5225 Walnut Avenue Property

A UST Corrective Action Completion report was prepared for the 5225 Walnut property and submitted to the IEPA (United Environmental Consultants, Inc., September 1999). A 2,500 gallon mineral spirits UST was removed from this property under OSFM Tank Removal Permit #00462-1999. The OSFM representative concluded upon removal that a release had occurred due to strong odors associated with the excavation and an observed sheen on water within the excavation cavity. The release was classified as a "minor" release. Incident No. 991205 was assigned to the release. Approximately 1,750 gallons of liquids were removed using vacuum equipment and approximately 195 cubic yards of soil and backfill were excavated and removed. UST excavation closure soil sampling took place in accordance with IEPA protocol and no constituents were detected above 35 Illinois Administrative Code (IAC) Part 742 Tier I soil cleanup objectives. Although specific correspondence is not available, Site personnel indicated that subsequent to the UST removal, three shallow groundwater monitoring wells were installed on the property to evaluate whether the UST had impacted shallow groundwater. No early results of sampling of these wells were received; however, these wells were sampled during the U.S. EPA Phase II SA in 2002 and VOCs were not detected.

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## **1. PERSONNEL ON SITE INFORMATION**

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## 1.1 WESTON REPRESENTATIVES

Organization/Branch	Name/Title	Address	Telephone
Weston Solutions, Inc. Midwest Division Vernon Hills, Illinois Office	James Burton, Program Manager	750 E Bunker Ct, Suite 500 Vernon Hills, IL 60061	847-918-4000
Weston Solutions, Inc. Midwest Division Chicago, Illinois Office	Joseph Ruiz, Site Manager	20 N Wacker Dr, Suite 1210 Chicago, IL 60606	312-424-3312
Weston Solutions, Inc. Midwest Division Vernon Hills, Illinois Office	Barry Crawford	750 E Bunker Ct, Suite 500 Vernon Hills, IL 60061	847-918-4121
Weston Solutions, Inc. Midwest Division Vernon Hills, Illinois Office	John Hunter	750 E Bunker Ct, Suite 500 Vernon Hills, IL 60061	847-918-4128
Weston Solutions, Inc. Midwest Division Chicago, Illinois Office	Trenna Sundquist	20 N Wacker Dr, Suite 1210 Chicago, IL 60606	312-424-3314
TBD	Other personnel as required	750 E Bunker Ct, Suite 500 Vernon Hills, IL 60061 and/or 20 N Wacker Dr, Suite 1210 Chicago, IL 60606	847-918-4000  312-424-3300

**Roles and Responsibilities:** James Burton is the Program Manager. Mr. Burton manages the RAC program operations and provides overall U.S. EPA contact for the WESTON RAC contract. Joseph Ruiz is the Site Manager. Mr. Ruiz manages the day-to-day operations of the Ellsworth Industrial Park Site and is the U.S. EPA's contact for this site. Field personnel will be selected at a later date.

## 1.2 WESTON SUBCONTRACTORS

Organization/Branch	Name/Title	Address	Telephone
Private Utility Locator/Surveyor Subcontractor-TBD			
Drilling Subcontractor-TBD			
Concrete Coring Subcontractor-TBD			

**Roles and Responsibilities:** The private utility locator/surveyor subcontractor will be responsible for utility locations not marked by JULIE. The drilling subcontractor will be responsible for direct-push drill rig (passive soil gas survey and soil sampling), EP-sonic (soil sampling), and HSA (well installation). The mobile laboratory subcontractor will be responsible for DSITMS sample analysis. The concrete coring subcontractor will be responsible for coring (sub-slab monitoring and passive soil gas survey).

## 1.3 SITE SPECIFIC SAFETY PERSONNEL

The Site Field Safety Officer (FSO) for activities to be conducted at this site is: Barry Crawford

The FSO has total responsibility for ensuring that the provisions of this Site HASP are adequate and implemented in the field.

Changing field conditions may require decisions to be made concerning adequate protection programs. Therefore, the personnel assigned as FSOs are experienced and meet the additional training requirements specified by OSHA in 29 CFR 1910.120.

**Qualifications:** Person selected for the site activities will be current on all required certifications including First Aid, CPR, Bloodborne Pathogens, 40-hr/Refresher, medical, and SHSC course.

**Designated alternates include:** John Hunter

## 1.3 SITE PERSONNEL AND CERTIFICATION STATUS

### 1.3.1 Weston Employee Certification

<b>Name:</b> Joseph Ruiz <b>Title:</b> Site Manager <b>Task(s):</b> 1-4 <b>Certification Level or Description:</b> <input checked="" type="checkbox"/> Medical Current <input checked="" type="checkbox"/> Training Current <input checked="" type="checkbox"/> Fit Test Current (Qual.) <input type="checkbox"/> Fit Test Current (Quant.)	<b>Name:</b> Barry Crawford <b>Title:</b> <b>Task(s):</b> 1-4 <b>Certification Level or Description:</b> <input checked="" type="checkbox"/> Medical Current <input checked="" type="checkbox"/> Training Current <input type="checkbox"/> Fit Test Current (Qual.) <input type="checkbox"/> Fit Test Current (Quant.)
<b>Name:</b> John Hunter <b>Title:</b> <b>Task(s):</b> 1-4 <b>Certification Level or Description:</b> <input checked="" type="checkbox"/> Medical Current <input checked="" type="checkbox"/> Training Current <input type="checkbox"/> Fit Test Current (Qual.) <input type="checkbox"/> Fit Test Current (Quant.)	<b>Name:</b> Trena Sundquist <b>Title:</b> <b>Task(s):</b> 1-4 <b>Certification Level or Description:</b> <input checked="" type="checkbox"/> Medical Current <input checked="" type="checkbox"/> Training Current <input type="checkbox"/> Fit Test Current (Qual.) <input type="checkbox"/> Fit Test Current (Quant.)
<b>Name:</b> <b>Title:</b> <b>Task(s):</b> <b>Certification Level or Description:</b> <input type="checkbox"/> Medical Current <input type="checkbox"/> Training Current <input type="checkbox"/> Fit Test Current (Qual.) <input type="checkbox"/> Fit Test Current (Quant.)	<b>Name:</b> <b>Title:</b> <b>Task(s):</b> <b>Certification Level or Description:</b> <input type="checkbox"/> Medical Current <input type="checkbox"/> Training Current <input type="checkbox"/> Fit Test Current (Qual.) <input type="checkbox"/> Fit Test Current (Quant.)
<b>Name:</b> <b>Title:</b> <b>Task(s):</b> <b>Certification Level or Description:</b> <input type="checkbox"/> Medical Current <input type="checkbox"/> Training Current <input type="checkbox"/> Fit Test Current (Qual.) <input type="checkbox"/> Fit Test Current (Quant.)	<b>Name:</b> <b>Title:</b> <b>Task(s):</b> <b>Certification Level or Description:</b> <input type="checkbox"/> Medical Current <input type="checkbox"/> Training Current <input type="checkbox"/> Fit Test Current (Qual.) <input type="checkbox"/> Fit Test Current (Quant.)
<b>Name:</b> <b>Title:</b> <b>Task(s):</b> <b>Certification Level or Description:</b> <input type="checkbox"/> Medical Current <input type="checkbox"/> Training Current <input type="checkbox"/> Fit Test Current (Qual.) <input type="checkbox"/> Fit Test Current (Quant.)	<b>Name:</b> <b>Title:</b> <b>Task(s):</b> <b>Certification Level or Description:</b> <input type="checkbox"/> Medical Current <input type="checkbox"/> Training Current <input type="checkbox"/> Fit Test Current (Qual.) <input type="checkbox"/> Fit Test Current (Quant.)
<b>Name:</b> <b>Title:</b> <b>Task(s):</b> <b>Certification Level or Description:</b> <input type="checkbox"/> Medical Current <input type="checkbox"/> Training Current <input type="checkbox"/> Fit Test Current (Qual.) <input type="checkbox"/> Fit Test Current (Quant.)	<b>Name:</b> <b>Title:</b> <b>Task(s):</b> <b>Certification Level or Description:</b> <input type="checkbox"/> Medical Current <input type="checkbox"/> Training Current <input type="checkbox"/> Fit Test Current (Qual.) <input type="checkbox"/> Fit Test Current (Quant.)

**TRAINING CURRENT - Training:** All personnel, including visitors, entering the exclusion or contamination reduction zones must have certifications of completion of training in accordance with OSHA 29 CFR 1910, 29 CFR 1926, or 29 CFR 1910.120.

**FIT TEST CURRENT - Respirator Fit Testing:** All persons, including visitors, entering any area requiring the use or potential use of any negative pressure respirator must have had, as a minimum, a qualitative fit test, administered in accordance with OSHA 29 CFR 1910.134 or ANSI, within the last 12 months. If site conditions require the use of a full-face, negative-pressure, air-purifying respirator for protection from asbestos or lead, employees must have had a qualitative fit test, administered according to OSHA 29 CFR 1910.1001 or 1025/1926, within the last 6 months.

**MEDICAL CURRENT - Medical Monitoring Requirements:** All personnel, including visitors, entering the exclusion or contamination reduction zones must be certified as medically fit to work and to wear a respirator, if appropriate, in accordance with 29 CFR 1910, 29 CFR 1926/1910, or 29 CFR 1910.120.

The Site Field Safety Officer is responsible for verifying all certifications and fit tests.

## SITE PERSONNEL CERTIFICATION STATUS

### 1.3.2 Subcontractor's Health and Safety Program Evaluation

**Name of Subcontractor:** TBD - Utility Contractor

**Address:**

**Activities To Be Conducted by Subcontractor:** The private utility locator/surveyor subcontractor will be responsible for utility locations not marked by JULIE.

Criteria		
Medical program meets OSHA/WESTON criteria  <input type="checkbox"/> Acceptable <input type="checkbox"/> Unacceptable  Comments:	Personal protective equipment available  <input type="checkbox"/> Acceptable <input type="checkbox"/> Unacceptable  Comments:	On-site monitoring equipment available, calibrated, and operated properly  <input type="checkbox"/> Acceptable <input type="checkbox"/> Unacceptable  Comments:
Safe working procedures clearly specified  <input type="checkbox"/> Acceptable <input type="checkbox"/> Unacceptable  Comments:	Training meets OSHA/WESTON criteria  <input type="checkbox"/> Acceptable <input type="checkbox"/> Unacceptable  Comments:	Emergency procedures  <input type="checkbox"/> Acceptable <input type="checkbox"/> Unacceptable  Comments:
Decontamination procedures  <input type="checkbox"/> Acceptable <input type="checkbox"/> Unacceptable  Comments:	General health and safety program evaluation  <input type="checkbox"/> Acceptable <input type="checkbox"/> Unacceptable  Comments:	Additional comments:  <input type="checkbox"/> Subcontractor has agreed to and will conform with the WESTON HASP for this project.  <input type="checkbox"/> Subcontractor will work under his own HASP, which has been accepted by project PM.

**Evaluation Conducted by:** Certifications for all subcontractors personnel will be added to the HASP prior to beginning work.

**Date:**

For	
<b>Name:</b> <b>Title:</b> <b>Task(s):</b> <b>Certification Level or Description:</b> <div style="display: flex; justify-content: space-between;"> <input type="checkbox"/> Medical Current                             <input type="checkbox"/> Training Current                         </div> <div style="display: flex; justify-content: space-between;"> <input type="checkbox"/> Fit Test Current (Qual )                             <input type="checkbox"/> Fit Test Current (Quant )                         </div>	<b>Name:</b> <b>Title:</b> <b>Task(s):</b> <b>Certification Level or Description:</b> <div style="display: flex; justify-content: space-between;"> <input type="checkbox"/> Medical Current                             <input type="checkbox"/> Training Current                         </div> <div style="display: flex; justify-content: space-between;"> <input type="checkbox"/> Fit Test Current (Qual )                             <input type="checkbox"/> Fit Test Current (Quant )                         </div>
<b>Name:</b> <b>Title:</b> <b>Task(s):</b> <b>Certification Level or Description:</b> <div style="display: flex; justify-content: space-between;"> <input type="checkbox"/> Medical Current                             <input type="checkbox"/> Training Current                         </div> <div style="display: flex; justify-content: space-between;"> <input type="checkbox"/> Fit Test Current (Qual )                             <input type="checkbox"/> Fit Test Current (Quant )                         </div>	<b>Name:</b> <b>Title:</b> <b>Task(s):</b> <b>Certification Level or Description:</b> <div style="display: flex; justify-content: space-between;"> <input type="checkbox"/> Medical Current                             <input type="checkbox"/> Training Current                         </div> <div style="display: flex; justify-content: space-between;"> <input type="checkbox"/> Fit Test Current (Qual )                             <input type="checkbox"/> Fit Test Current (Quant )                         </div>

## SUBCONTRACTOR PERSONNEL AND CERTIFICATION STATUS

### 1.3.3 Subcontractor's Health and Safety Program Evaluation

**Name of Subcontractor:** TBD – Drilling Contractor

**Address:**

**Activities To Be Conducted by Subcontractor:** The drilling subcontractor will be responsible for direct-push drill rig (soil sampling), EP-sonic (soil sampling), and HSA (well installation).

#### Evaluation Criteria

Medical program meets OSHA/WESTON criteria

- ☐ Acceptable  
☐ Unacceptable

Comments:

Personal protective equipment available

- ☐ Acceptable  
☐ Unacceptable

Comments:

On-site monitoring equipment available, calibrated, and operated properly

- ☐ Acceptable  
☐ Unacceptable

Comments:

Safe working procedures clearly specified

- ☐ Acceptable  
☐ Unacceptable

Comments:

Training meets OSHA/WESTON criteria

- ☐ Acceptable  
☐ Unacceptable

Comments:

Emergency procedures

- ☐ Acceptable  
☐ Unacceptable

Comments:

Decontamination procedures

- ☐ Acceptable  
☐ Unacceptable

Comments:

General health and safety program evaluation

- ☐ Acceptable  
☐ Unacceptable

Comments:

Additional comments:

- ☐ Subcontractor has agreed to and will conform with the WESTON HASP for this project.  
☐ Subcontractor will work under his own HASP, which has been accepted by project PM.

**Evaluation Conducted by:** Certifications for all subcontractors personnel will be added to the HASP prior to beginning work.

**Date:**

**Name:**

**Title:**

**Task(s):**

**Certification Level or Description:**

- ☐ Medical Current ☐ Training Current  
☐ Fit Test Current (Qual.) ☐ Fit Test Current (Quant.)

**Name:**

**Title:**

**Task(s):**

**Certification Level or Description:**

- ☐ Medical Current ☐ Training Current  
☐ Fit Test Current (Qual.) ☐ Fit Test Current (Quant.)

**Name:**

**Title:**

**Task(s):**

**Certification Level or Description:**

- ☐ Medical Current ☐ Training Current  
☐ Fit Test Current (Qual.) ☐ Fit Test Current (Quant.)

**Name:**

**Title:**

**Task(s):**

**Certification Level or Description:**

- ☐ Medical Current ☐ Training Current  
☐ Fit Test Current (Qual.) ☐ Fit Test Current (Quant.)

## SITE PERSONNEL CERTIFICATION STATUS

### 1.3.4 Subcontractor's Health and Safety Program Evaluation

**Name of Subcontractor:** TBD – Concrete Coring Contractor

**Address:**

**Activities To Be Conducted by Subcontractor:** The concrete coring subcontractor will be responsible for coring (sub-slab monitoring).

Criteria		
<b>Medical program meets OSHA/WESTON criteria</b> <input type="checkbox"/> Acceptable <input type="checkbox"/> Unacceptable <b>Comments:</b>	<b>Personal protective equipment available</b> <input type="checkbox"/> Acceptable <input type="checkbox"/> Unacceptable <b>Comments:</b>	<b>On-site monitoring equipment available, calibrated, and operated properly</b> <input type="checkbox"/> Acceptable <input type="checkbox"/> Unacceptable <b>Comments:</b>
<b>Safe working procedures clearly specified</b> <input type="checkbox"/> Acceptable <input type="checkbox"/> Unacceptable <b>Comments:</b>	<b>Training meets OSHA/WESTON criteria</b> <input type="checkbox"/> Acceptable <input type="checkbox"/> Unacceptable <b>Comments:</b>	<b>Emergency procedures</b> <input type="checkbox"/> Acceptable <input type="checkbox"/> Unacceptable <b>Comments:</b>
<b>Decontamination procedures</b> <input type="checkbox"/> Acceptable <input type="checkbox"/> Unacceptable <b>Comments:</b>	<b>General health and safety program evaluation</b> <input type="checkbox"/> Acceptable <input type="checkbox"/> Unacceptable <b>Comments:</b>	<b>Additional comments:</b> <input type="checkbox"/> Subcontractor has agreed to and will conform with the WESTON HASP for this project. <input type="checkbox"/> Subcontractor will work under his own HASP, which has been accepted by project PM.

**Evaluation Conducted by:** Certifications for all subcontractors personnel will be added to the HASP prior to beginning work.

**Date:**

<b>Name:</b> <b>Title:</b> <b>Task(s):</b> <b>Certification Level or Description:</b> <div style="display: flex; justify-content: space-between;"> <input type="checkbox"/> Medical Current                             <input type="checkbox"/> Training Current                         </div> <div style="display: flex; justify-content: space-between;"> <input type="checkbox"/> Fit Test Current (Qual )                             <input type="checkbox"/> Fit Test Current (Quant.)                         </div>	<b>Name:</b> <b>Title:</b> <b>Task(s):</b> <b>Certification Level or Description:</b> <div style="display: flex; justify-content: space-between;"> <input type="checkbox"/> Medical Current                             <input type="checkbox"/> Training Current                         </div> <div style="display: flex; justify-content: space-between;"> <input type="checkbox"/> Fit Test Current (Qual )                             <input type="checkbox"/> Fit Test Current (Quant )                         </div>
<b>Name:</b> <b>Title:</b> <b>Task(s):</b> <b>Certification Level or Description:</b> <div style="display: flex; justify-content: space-between;"> <input type="checkbox"/> Medical Current                             <input type="checkbox"/> Training Current                         </div> <div style="display: flex; justify-content: space-between;"> <input type="checkbox"/> Fit Test Current (Qual )                             <input type="checkbox"/> Fit Test Current (Quant.)                         </div>	<b>Name:</b> <b>Title:</b> <b>Task(s):</b> <b>Certification Level or Description:</b> <div style="display: flex; justify-content: space-between;"> <input type="checkbox"/> Medical Current                             <input type="checkbox"/> Training Current                         </div> <div style="display: flex; justify-content: space-between;"> <input type="checkbox"/> Fit Test Current (Qual )                             <input type="checkbox"/> Fit Test Current (Quant )                         </div>

## **2. HEALTH AND SAFETY EVALUATION**

## 2.1 HEALTH AND SAFETY EVALUATION

### 2.1.1 Initial Assessment

Background Review: ☒ Complete ☐ Partial If partial why?

#### Activities Covered Under This Plan: ALL

No.	Task/Subtask	Description	Schedule
1	Utility Corridor Investigation – Private Utility Locator/Surveyor Subcontractor and WESTON	Data gathering and compilation consists of reviewing available records (DuPage County maps, individual facility records and maps, private utility records). An inspection may be conducted which may consist of visual survey, dye testing, inspection camera survey, and inspection radio tracking survey.  Vapor sampling will be conducted within the underground utility corridors. Vapor samples will be collected from easily accessible locations (catch basins, sumps, traps, manholes, and outfalls). Vapor samples will be collected within charcoal tubes and will be submitted to the US EPA ERT/REAC laboratory.	~ 1 week
2	Sub-Slab Monitoring – Concrete Coring Subcontractor; Passive Soil Gas Subcontractor; and WESTON	Concrete coring will be conducted through the building slabs. Passive soil gas samples may be collected from variable depths from the granular backfill located under building slabs or foundations. The samplers will generally be exposed to subsurface gas for 3 days. Samples will be retrieved and shipped to Beacon Environmental Services for VOC analysis	~ 1 week
3	Soil Investigation – Drilling Subcontractor; Mobile Laboratory Subcontractor; Geotechnical Laboratory Subcontractor; and WESTON	Direct-push and EP-sonic drilling techniques will be used to conduct soil investigations at Study Areas A through K; 2500 Curtiss; and Curtiss and Glenview Intersection. Soil borings are expected to be advanced in general to 20 to 40-feet bgs, with the termination depth to be based on field observations and the results of real-time mobile laboratory analysis. Approximately 20% of the borings may be advanced to bedrock using EP-sonic drilling.  Soil samples will be analyzed on-site using the U.S. EPA Region V ESAT Mobile Laboratory, employing GC/MS technology. All of these samples will be forwarded to U.S. EPA Region V CRL for percent moisture analysis. Approximately 30% of all soil samples will be split and submitted to CRL for VOCs analysis as a QA/QC measure of the mobile lab. Select samples will also be submitted to CRL for total organic carbon (TOC), and grain size. In addition, select samples will be submitted to ESN for cation exchange capacity (CEC) and oxidation-reduction potential (ORP); and CGC for in-situ hydraulic permeability analyses.	6 to 12 weeks
4	Groundwater Investigation – Drilling Subcontractor and WESTON	Grab groundwater samples will be collected with temporary 1-inch PVC piezometers in the soil borings at the depth where groundwater is encountered. Monitoring wells will be advanced using either standard HSA or sonic drilling techniques. Monitoring wells installed in areas where more than one of the groundwater types (shallow, intermediate, bedrock) is present, will be installed in nests.  WESTON will subcontract an Illinois Licensed Land Surveyor to conduct the horizontal and vertical survey of the newly installed wells to an accuracy of 0.01 foot, sufficient to allow water level measurement data to be used for groundwater flow mapping.  Single well permeability tests (slug tests) will be conducted on each of the newly installed monitoring wells to estimate the hydraulic conductivity. Rising-head and falling-head water levels will be measured using a Hermit SE3000 (or equivalent) data logger equipped with an electronic pressure transducer.  One groundwater sampling event at all new and existing wells at the	6 to 12 weeks

		<p>OU1 Ellsworth Site will be conducted. The four off-site bedrock wells, including the well nest, will also be included in this sampling event.</p> <p>All monitoring well and soil boring groundwater samples will be shipped to CRL for VOCs analysis. Field measurements (DO, ORP, pH, conductivity, and temperature) will be collected. Select samples will be analyzed for major anions (fluoride, chloride, nitrate), alkalinity, and TOC conducted by CRL and sulfate and dissolved hydrocarbon gases (methane, ethane, ethene) conducted by ESN.</p>	
<b>Types of Hazards:</b> Numbers refer to one of the following hazard evaluation forms. Complete hazard evaluation forms for each appropriate hazard class.			
<b>Physiochemical 1</b> <input checked="" type="checkbox"/> Flammable <input checked="" type="checkbox"/> Explosive <input type="checkbox"/> Corrosive <input checked="" type="checkbox"/> Reactive <input type="checkbox"/> O <sub>2</sub> Rich <input type="checkbox"/> O <sub>2</sub> Deficient	<b>Chemically Toxic 1</b> <input checked="" type="checkbox"/> Inhalation <input checked="" type="checkbox"/> Carcinogen <input checked="" type="checkbox"/> Ingestion <input type="checkbox"/> Mutagen <input checked="" type="checkbox"/> Contact <input type="checkbox"/> Teratogen <input type="checkbox"/> Absorption <input type="checkbox"/> OSHA 1910.1000 Substance (Air Contaminants) <input type="checkbox"/> OSHA Specific Hazard Substance Standard (Refer to following page for listing)	<b>Radiation 3</b> Ionizing: <input type="checkbox"/> Internal exposure <input type="checkbox"/> External exposure  Non-ionizing: <input checked="" type="checkbox"/> UV <input type="checkbox"/> IR <input type="checkbox"/> RF <input type="checkbox"/> MicroW <input type="checkbox"/> Laser	<b>Biological 2</b> <input type="checkbox"/> Etiological Agent <input checked="" type="checkbox"/> Other (plant, insect, animal)  <input checked="" type="checkbox"/> <b>Physical Hazards 4</b> <input checked="" type="checkbox"/> Construction Activities
<b>Physical Location of Contaminants and Hazardous Substances</b>			
<b>Directly Related to Tasks</b> <input checked="" type="checkbox"/> Air <input type="checkbox"/> Other Surface <input checked="" type="checkbox"/> Groundwater <input checked="" type="checkbox"/> Soil <input type="checkbox"/> Surface Water <input type="checkbox"/> Sanitary Wastewater <input type="checkbox"/> Process Wastewater <input type="checkbox"/> Other _____	<b>Indirectly Related to Tasks — Nearby Process(es) That Could Affect Team Members:</b> <input type="checkbox"/> Client Facility/WESTON Work Location <input type="checkbox"/> Nearby Non-Client Facility <input checked="" type="checkbox"/> Have activities (task[s]) been coordinated with facility? Each facility will be notified of impending schedule and work. EPA will help coordinate access.		



## HEALTH AND SAFETY EVALUATION

### 2.1.2 Chemical Hazards of Concern

<input type="checkbox"/> <b>N/A</b> Chemical Contaminants of Concern Provide the data requested for chemical contaminants on HASP Form 25 or attach data sheets from an acceptable source such as NIOSH pocket guide, condensed chemical dictionary, ACGIH TLV booklet, etc. List chemicals and concentrations below and locate data sheets in Attachment B of this HASP.	<input type="checkbox"/> <b>N/A</b> Identify hazardous materials used or on-site and attach Material Safety Data Sheets (MSDSs) for all reagent type chemicals, solutions, or other identified materials that in normal use in performing tasks related to this project could produce hazardous substances. Ensure that all subcontractors and other parties working nearby are informed of the presence of these chemicals and the location of the MSDSs. Obtain from subcontractors and other parties, lists of the hazardous materials they use or have on-site and identify location of the MSDSs here. List chemicals and quantities below and locate MSDSs in Attachment B of this HASP.
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Chemical Name	Concentration (if known)	Chemical Name	Quantity
1,1,1-Trichloroethane	0-19,000 ug/kg (soil); 0-1,200 ug/L (gw)	Gasoline (fuel)	minimal
1,1-Dichloroethene	0-480 ug/kg (soil); 0-42 ug/L (gw)	Diesel (fuel)	minimal
1,2-Dichloroethane	0-2 ug/L (gw)	Alconox or equivalent (diluted solution)	minimal
Carbon Tetrachloride	0-84 ug/kg (soil); 0-18 ug/L (gw)	Hydrochloric acid (preservative)	minimal
Cis-1,2-Dichloroethene	0-200 ug/L (gw)	Sulfuric acid (preservative)	minimal
Tetrachloroethene	0-120,000 ug/kg (soil); 0-340 ug/L (gw)	Calibration gases	minimal
Trans-1,2-Dichloroethene	0-910 ug/kg (soil)		
Trichloroethylene	0-500,000 ug/kg (soil); 0-218 ug/L (gw)		
Vinyl Chloride	0-<10 ug/kg (soil); 0-2 ug/L (gw)		

**OSHA-SPECIFIC HAZARDOUS SUBSTANCES**

The following substances may require specific medical, training, or monitoring based on concentration or evaluation of risk. See the appropriate citation listed under 29 CFR 1910 or 1926 for additional information.

<input type="checkbox"/> 1910.1001 Asbestos <input type="checkbox"/> 1910.1005 [Reserved] <input type="checkbox"/> 1910.1009 beta-Naphthylamine <input type="checkbox"/> 1910.1013 beta-Propiolactone <input checked="" type="checkbox"/> 1910.1017 Vinyl chloride <input type="checkbox"/> 1910.1028 Benzene <input type="checkbox"/> 1910.1045 Acrylonitrile <input type="checkbox"/> 1910.1051 1,3 Butadiene	<input type="checkbox"/> 1910.1002 Coal tar pitch volatiles <input type="checkbox"/> 1910.1006 Methyl chloromethyl ether <input type="checkbox"/> 1910.1010 Benzidine <input type="checkbox"/> 1910.1014 2-Acetylaminofluorene <input type="checkbox"/> 1910.1018 Inorganic arsenic <input type="checkbox"/> 1910.1029 Coke oven emissions <input type="checkbox"/> 1910.1047 Ethylene oxide <input type="checkbox"/> 1910.1052 Methylene chloride  <input type="checkbox"/> 1910.1003 4-Nitrobiphenyl, etc. <input type="checkbox"/> 1910.1007 3,3'-Dichlorobenzidine (and its salts) <input type="checkbox"/> 1910.1011 4-Aminodiphenyl <input type="checkbox"/> 1910.1015 4-Dimethylaminoazobenzene <input type="checkbox"/> 1910.1025 Lead (Att. FLD# 46) <input type="checkbox"/> 1910.1043 Cotton dust <input type="checkbox"/> 1910.1048 Formaldehyde
--	---

<input type="checkbox"/> 1910.1004 alpha-Naphthylamine <input type="checkbox"/> 1910.1008 bis-Chloromethyl ether <input type="checkbox"/> 1910.1012 Ethyleneimine <input type="checkbox"/> 1910.1016 N-Nitrosodimethylamine <input type="checkbox"/> 1910.1027 Cadmium <input type="checkbox"/> 1910.1044 1,2-Dibromo-3-chloropropane <input type="checkbox"/> 1910.1050 Methyleneedianiline	
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## HEALTH AND SAFETY EVALUATION

### 2.1.3 Biological Hazards of Concern

☒ **Poisonous Plants (FLD 43)**

Location/Task No(s):

Source: ☐ Known ☒ Suspect

Route of Exposure: ☐ Inhalation ☐ Ingestion  
☒ Contact ☐ Direct Penetration

Team Member(s) Allergic: ☐ Yes ☒ No

Immunization required: ☐ Yes ☒ No

☒ **Insects (FLD 43)**

Location/Task No(s):

Source: ☐ Known ☒ Suspect

Route of Exposure: ☐ Inhalation ☐ Ingestion  
☐ Contact ☒ Direct Penetration

Team Member(s) Allergic: ☐ Yes ☒ No

Immunization required: ☐ Yes ☒ No

☐ **Snakes, Reptiles (FLD 43)**

Location/Task No(s):

Source: ☐ Known ☐ Suspect

Route of Exposure: ☐ Inhalation ☐ Ingestion  
☐ Contact ☐ Direct Penetration

Team Member(s) Allergic: ☐ Yes ☐ No

Immunization required: ☐ Yes ☐ No

☒ **Animals (FLD 43)**

Location/Task No(s):

Source: ☐ Known ☒ Suspect

Route of Exposure: ☐ Inhalation ☐ Ingestion  
☐ Contact ☒ Direct Penetration

Team Member(s) Allergic: ☐ Yes ☒ No

Immunization required: ☐ Yes ☒ No

FLD 43 — WESTON Biohazard Field Operating Procedures: Att. OP ☐

☐ **Sewage**

Location/Task No(s):

Source: ☐ Known ☐ Suspect

Route of Exposure: ☐ Inhalation ☐ Ingestion  
☐ Contact ☐ Direct Penetration

Team Member(s) Allergic: ☐ Yes ☐ No

Immunization required: ☐ Yes ☐ No

Tetanus Vaccination within Past 10 yrs: ☐ Yes ☐ No

☐ **Etiologic Agents (List)**

Location/Task No(s):

Source: ☐ Known ☐ Suspect

Route of Exposure: ☐ Inhalation ☐ Ingestion  
☐ Contact ☐ Direct Penetration

Team Member(s) Allergic: ☐ Yes ☐ No

Immunization required: ☐ Yes ☐ No

FLD 44 — WESTON Bloodborne Pathogens Exposure Control Plan – First Aid Procedures: Att. OP ☒

FLD 45 — WESTON Bloodborne Pathogens Exposure Control Plan – Working with Infectious Waste: Att. OP ☐

# HEALTH AND SAFETY EVALUATION

## 2.1-4 Radiation Hazards

### NONIONIZING RADIATION

Task No.	Type of Nonionizing Radiation	Source On-Site	TLV/PEL	Wavelength Range	Control Measures	Monitoring Instrument
1-4	Ultraviolet	Solar		2920-4000	Appropriate clothing/sunscreen	Eyes
	Infrared	N/A				
	Radio Frequency	N/A				
	Microwave	N/A				
	Laser	N/A				

### DAC (µCiil/mL)

Task No.	Radionuclide	Major Radiations	Radioactive Half-Life (Years)	D	W	Y	Surface Contamination Limit	Monitoring Instrument

## HEALTH AND SAFETY EVALUATION

### 2.1.5 Physical Hazards of Concern

Phy. Haz. Cond.	Physical Hazard	Attach OP	WESTON OP Titles
Loud noise	Hearing loss/disruption of communication	<input checked="" type="checkbox"/>	FLD01 - Noise Protection
Inclement weather	Rain/humidity/cold/ice/snow/lightning	<input checked="" type="checkbox"/>	FLD02 - Inclement Weather
Steam heat stress	Burns/displaced oxygen/wet working surfaces	<input type="checkbox"/>	FLD03 - Hot Process - Steam
Heat stress	Burns/hot surfaces/low pressure steam	<input type="checkbox"/>	FLD04 - Hot Process - LT3
Ambient heat stress	Heat rash/cramps/exhaustion/heat stroke	<input checked="" type="checkbox"/>	FLD05 - Heat Stress Prevention/Monitoring
Cold stress	Hypothermia/frostbite	<input checked="" type="checkbox"/>	FLD06 - Cold Stress
Cold/wet	Trench/paddy/immersion foot/edema	<input checked="" type="checkbox"/>	FLD07 - Wet Feet
Confined spaces	Falls/burns/drowning/engulfment/electrocution	<input checked="" type="checkbox"/>	FLD08 - Confined Space Entry
Explosive vapors	Thermal burns/impaction/dismemberment	<input type="checkbox"/>	FLD09 - Hot Work
Improper lifting	Back strain/abdomen/arm/leg muscle/joint injury	<input checked="" type="checkbox"/>	FLD10 - Manual Lifting/Handling Heavy Objects
Uneven surfaces	Vehicle accidents/slips/trips/falls	<input checked="" type="checkbox"/>	FLD11 - Rough Terrain
Poor housekeeping	Slips/trips/falls/punctures/cuts/fires	<input checked="" type="checkbox"/>	FLD12 - Housekeeping
Structural integrity	Crushing/overhead hazards/compromised floors	<input type="checkbox"/>	FLD13 - Structural Integrity
Hostile persons	Bodily injury	<input checked="" type="checkbox"/>	FLD14 - Site Security
Remote area	Slips/trips/falls/back strain/communication	<input checked="" type="checkbox"/>	FLD15 - Remote Area
Improper cyl. handling	Mechanical injury/fire/explosion/suffocation	<input type="checkbox"/>	FLD16 - Pressure Systems - Compressed Gases
Water hazards	Poor visibility/entanglement/drowning/cold stress	<input type="checkbox"/>	FLD17 - Diving
Water hazards	Drowning/heat/cold stress/hypothermia/falls	<input type="checkbox"/>	FLD18 - Operation and Use of Boats
Water hazards	Drowning/frostbite/hypothermia/falls/electrocution	<input type="checkbox"/>	FLD19 - Working Over Water
Vehicle hazards	Struck by vehicle/collision	<input checked="" type="checkbox"/>	FLD20 - Traffic
Explosions	Explosion/fire/thermal burns	<input type="checkbox"/>	FLD21 - Explosives
Moving mechanical parts	Crushing/pinch points/overhead hazards/electrocution	<input checked="" type="checkbox"/>	FLD22 - Heavy Equipment Operation
Moving mech. parts	Overhead hazards/electrocution	<input checked="" type="checkbox"/>	FLD23 - Cranes/Lifting Equipment Operation
Working at elevation	Overhead hazards/falls/electrocution	<input type="checkbox"/>	FLD24 - Aerial Lifts/Man lifts
Working at elevation	Overhead hazards/falls/electrocution	<input type="checkbox"/>	FLD25 - Working at Elevation
Working at elevation	Overhead hazards/falls/electrocution/slips	<input type="checkbox"/>	FLD26 - Ladders
Working at elevation	Slips/trips/falls/overhead hazards	<input type="checkbox"/>	FLD27 - Scaffolding
Trench cave-in	Crushing/falling/overhead hazards/suffocation	<input type="checkbox"/>	FLD28 - Excavating/Trenching
Improper material handling	Back injury/crushing from load shifts	<input checked="" type="checkbox"/>	FLD29 - Materials Handling
Physiochemical	Explosions/fires from oxidizing, flam./corr. material	<input type="checkbox"/>	FLD30 - Hazardous Materials Use/Storage
Physiochemical	Fire and explosion	<input type="checkbox"/>	FLD31 - Fire Prevention/Response Plan Required
Physiochemical	Fire	<input checked="" type="checkbox"/>	FLD32 - Fire Extinguishers Required
Structural integrity	Overhead/electrocution/slips/trips/falls/fire	<input type="checkbox"/>	FLD33 - Demolition
Electrical	Electrocution/shock/thermal burns	<input checked="" type="checkbox"/>	FLD34 - Utilities
Electrical	Electrocution/shock/thermal burns	<input checked="" type="checkbox"/>	FLD35 - Electrical Safety
Burns/fires	Heat stress/fires/burns	<input checked="" type="checkbox"/>	FLD36 - Welding/Cutting/Burning
Impact/thermal	Thermal burns/high pressure impaction/heat stress	<input checked="" type="checkbox"/>	FLD37 - High Pressure Washers
Impaction/electrical	Smashing body parts/pinching/cuts/electrocution	<input checked="" type="checkbox"/>	FLD38 - Hand and Power Tools
Poor visibility	Slips/trips/falls	<input checked="" type="checkbox"/>	FLD39 - Illumination
Fire/explosion	Burns/impaction	<input type="checkbox"/>	FLD40 - Storage Tank Removal/Decommissioning
Communications	Disruption of communications	<input checked="" type="checkbox"/>	FLD41 - Std. Hand/Emergency Signals
Energy/release	Unexpected release of energy	<input type="checkbox"/>	FLD42 - Lockout/Tag-out
Drilling hazards	Electrocution/overhead hazards/pinch points	<input checked="" type="checkbox"/>	2.5 - Drilling Safety Guide

### **3. TASK BY TASK ASSESMENT**



### 3.1 TASK-BY-TASK RISK ASSESSMENT

#### 3.1.1 Description

**TASK 1:** Utility Corridor Investigation – Private Utility Locator/Surveyor SUBCONTRACTOR will be required to determine the location of underground utilities not marked by JULIE. WESTON will conduct data gathering and compilation and vapor sampling. WESTON will oversee all activities.

#### EQUIPMENT REQUIRED/USED

Coveralls	Hard Hat	Sample Containers
Gloves (work and nitrile)	Dye testing	
Steel-Toed Boots	Camera survey	
Safety Glasses	Radio tracking survey	
Ear Plugs		

#### POTENTIAL HAZARDS/RISKS

##### Chemical

☐ Hazard Present Risk Level: ☐ H ☐ M ☐ L  
What justifies risk level?

##### Physical

☒ Hazard Present Risk Level: ☐ H ☒ M ☐ L  
What justifies risk level?  
Inclement weather: Observation and avoidance of extreme conditions.  
Heat and Cold Stress: Dress appropriately for the weather and take frequent breaks.  
Uneven Surfaces: Keep work area free of debris. Pay attention to uneven surface hazards. Work during daylight hours or provide proper artificial lighting.  
Moving Mechanical Parts: Pay attention to traffic areas at all times.

##### Biological

☒ Hazard Present Risk Level: ☐ H ☐ M ☒ L  
What justifies risk level?  
Suspected source of poisonous plants, insects, and animals.  
Poisonous Plants: Recognition and avoidance, cover skin completely, and wash thoroughly after possible exposure.  
Insects: Cover skin completely, insect repellent, buddy system to observe partner and check for insect presence.  
Animals: Buddy system and tetanus shots.

##### Radiological

☒ Hazard Present Risk Level: ☐ H ☐ M ☒ L  
What justifies risk level?  
Ultraviolet non-ionizing radiation: Dress appropriately and wear sunscreen.

#### LEVELS OF PROTECTION/JUSTIFICATION

Level D PPE.

#### SAFETY PROCEDURES REQUIRED AND/OR FIELD OPS UTILIZED

All work will be performed in accordance with the provisions of this HASP, OSHA guidelines, and WESTON Standard Operating Procedures.

### 3.1 TASK-BY-TASK RISK ASSESSMENT

#### 3.1.2 Task 2 Description

**TASK 2:** Sub-Slab Monitoring – Concrete coring SUBCONTRACTOR responsible for coring through building slabs. WESTON will collect soil gas samples from the granular backfill and will oversee all activities.

#### EQUIPMENT REQUIRED/USED

Coveralls	Hard Hat	EMFLUX adsorbent sampling system
Gloves (work and nitrile)	Concrete corer	
Steel-Toed Boots	Air monitoring equipment	
Safety Glasses	Concrete corer	
Ear Plugs	Sample Containers	

#### POTENTIAL HAZARDS/RISKS

##### Chemical

☐ Hazard Present Risk Level: ☐ H ☐ M ☐ L  
What justifies risk level?

##### Physical

☒ Hazard Present Risk Level: ☐ H ☒ M ☐ L  
What justifies risk level?  
Loud Noise: Hearing protection and/or limit time around concrete corer.  
Inclement weather: Observation and avoidance of extreme conditions.  
Heat and Cold Stress: Dress appropriately for the weather and take frequent breaks.  
Uneven Surfaces: Keep work area free of debris. Pay attention to uneven surface hazards. Work during daylight hours or provide proper artificial lighting.  
Moving Mechanical Parts: Pay attention to traffic areas/concrete corer at all times. Stay in view of operators at all times.

##### Biological

☒ Hazard Present Risk Level: ☐ H ☐ M ☒ L  
What justifies risk level?  
Suspected source of poisonous plants, insects, and animals.  
Poisonous Plants: Recognition and avoidance, cover skin completely, and wash thoroughly after possible exposure.  
Insects: Cover skin completely, insect repellent, buddy system to observe partner and check for insect presence.  
Animals: Buddy system and tetanus shots.

##### Radiological

☒ Hazard Present Risk Level: ☐ H ☐ M ☒ L  
What justifies risk level?  
Ultraviolet non-ionizing radiation: Dress appropriately and wear sunscreen.

#### LEVELS OF PROTECTION/JUSTIFICATION

Level D PPE.

#### SAFETY PROCEDURES REQUIRED AND/OR FIELD OPS UTILIZED

All work will be performed in accordance with the provisions of this HASP, OSHA guidelines, and WESTON Standard Operating Procedures.



3.1 TASK BY TASK RISK ASSESSMENT	
3.1.3 Description	
<b>TASK 3:</b> Soil Investigation – Drilling SUBCONTRACTOR will be responsible for direct-push and EP-sonic drilling techniques. WESTON will collect samples and oversee all activities.	
EQUIPMENT REQUIRED/USED	
Coveralls Gloves (work and nitrile) Steel-Toed Boots Safety Glasses Ear Plugs	Hard Hat Direct-push drill rig  Sample Containers
HAZARDS/RISKS	
Chemical	
<input type="checkbox"/> Hazard Present      Risk Level: <input type="checkbox"/> H <input type="checkbox"/> M <input type="checkbox"/> L What justifies risk level?	
Physical	
<input checked="" type="checkbox"/> Hazard Present      Risk Level: <input type="checkbox"/> H <input checked="" type="checkbox"/> M <input type="checkbox"/> L What justifies risk level? Loud Noise: Hearing protection and/or limit time around drill rig. Inclement weather: Observation and avoidance of extreme conditions. Heat and Cold Stress: Dress appropriately for the weather and take frequent breaks. Uneven Surfaces: Keep work area free of debris. Pay attention to uneven surface hazards. Work during daylight hours or provide proper artificial lighting. Moving Mechanical Parts: Pay attention to traffic areas/drill rig at all times. Stay in view of operators at all times. Utilities: Call JULIE to have utilities marked. Observation and avoidance of all underground and overhead utility lines.	
Biological	
<input checked="" type="checkbox"/> Hazard Present      Risk Level: <input type="checkbox"/> H <input type="checkbox"/> M <input checked="" type="checkbox"/> L What justifies risk level? Suspected source of poisonous plants, insects, and animals. Poisonous Plants: Recognition and avoidance, cover skin completely, and wash thoroughly after possible exposure. Insects: Cover skin completely, insect repellent, buddy system to observe partner and check for insect presence. Animals: Buddy system and tetanus shots.	
Radiological	
<input checked="" type="checkbox"/> Hazard Present      Risk Level: <input type="checkbox"/> H <input type="checkbox"/> M <input checked="" type="checkbox"/> L What justifies risk level? Ultraviolet non-ionizing radiation: Dress appropriately and wear sunscreen.	
LEVELS OF PROTECTION JUSTIFICATION	
Level D PPE.	
SAFETY PROCEDURES AND/OR FIELD OPS UTILIZED	
All work will be performed in accordance with the provisions of this HASP, OSHA guidelines, and WESTON Standard Operating Procedures.	

### 3.1 TASK-BY-TASK RISK ASSESSMENT

#### 3.1.4 Task 4 Description

**TASK 4:** Groundwater Investigation – Drilling SUBCONTRACTOR will be responsible for HSA or sonic drilling techniques. WESTON will collect samples, conduct slug tests, collect field measurements, and oversee all activities.

#### EQUIPMENT REQUIRED/USED

Coveralls	Hard Hat
Gloves (work and nitrile)	HSA
Steel-Toed Boots	Bailer, pump
Safety Glasses	Sample Containers
Ear Plugs	Water Level Tape

#### POTENTIAL HAZARD/RISKS

##### Chemical

☐ Hazard Present  
What justifies risk level?

Risk Level: ☐ H ☐ M ☐ L

##### Physical

☒ Hazard Present  
What justifies risk level?

Risk Level: ☐ H ☒ M ☐ L

Loud Noise: Hearing protection and/or limit time around drill rig.  
Inclement weather: Observation and avoidance of extreme conditions.  
Heat and Cold Stress: Dress appropriately for the weather and take frequent breaks.  
Uneven Surfaces: Keep work area free of debris. Pay attention to uneven surface hazards. Work during daylight hours or provide proper artificial lighting.  
Moving Mechanical Parts: Pay attention to traffic areas/drill rig at all times. Stay in view of operators at all times.

##### Biological

☒ Hazard Present  
What justifies risk level?

Risk Level: ☐ H ☐ M ☒ L

Suspected source of poisonous plants, insects, and animals.  
Poisonous Plants: Recognition and avoidance, cover skin completely, and wash thoroughly after possible exposure.  
Insects: Cover skin completely, insect repellent, buddy system to observe partner and check for insect presence.  
Animals: Buddy system and tetanus shots.

##### Radiological

☒ Hazard Present  
What justifies risk level?

Risk Level: ☐ H ☐ M ☒ L

Ultraviolet non-ionizing radiation: Dress appropriately and wear sunscreen.

#### LEVELS OF PROTECTION/JUSTIFICATION

Level D PPE.

#### SAFETY PROCEDURES REQUIRED AND/OR FIELD OPS UTILIZED

All work will be performed in accordance with the provisions of this HASP, OSHA guidelines, and WESTON Standard Operating Procedures.

### 3.2 PERSONNEL PROTECTION PLAN

#### Engineering Controls

Describe Engineering Controls used as part of Personnel Protection Plan:

Task(s)

1-4 Decontamination of all equipment and personnel.

#### Administrative Controls

Describe Administrative Controls used as part of Personnel Protection Plan:

Task(s)

#### Personal Protective Equipment

Action Levels for Changing Levels of Protection. Refer to HASP Form 13, Site Air Monitoring Program—Action Levels Define Action Levels for up or down grade for each task

Task(s)

1-4 Level D PPE

#### Level of Protection

##### Level D

Task(s): 1-4

- ☒ Head Hard Hat
- ☒ Eye and Face Safety Glasses
- ☒ Hearing Ear Plugs, as appropriate
- ☐ Arms and Legs Only
- ☒ Appropriate Work Uniform
- ☒ Hand – Gloves Work and Nitrile Gloves
- ☒ Foot - Safety Boots Steel Toe
- ☐ Fall Protection
- ☐ Flotation
- ☐ Other

##### Level D Modified

Task(s):

- ☐ Head
- ☐ Eye and Face
- ☐ Hearing
- ☐ Arms and Legs Only
- ☐ Whole Body
- ☐ Apron
- ☐ Hand - Gloves
- ☐ Gloves
- ☐ Foot - Safety Boots
- ☐ Over Boots

### 3.3 DESCRIPTION OF LEVELS OF PROTECTION

Level C	Level B
<b>Task(s):</b> <input type="checkbox"/> Head <input type="checkbox"/> Eye and Face <input type="checkbox"/> Hearing <input type="checkbox"/> Arms and Legs Only <input type="checkbox"/> Whole Body <input type="checkbox"/> Apron <input type="checkbox"/> Hand - Gloves <input type="checkbox"/> Gloves <input type="checkbox"/> Gloves <input type="checkbox"/> Foot - Safety Boots <input type="checkbox"/> Outer Boots <input type="checkbox"/> Boots (Other) <hr/> <input type="checkbox"/> Half Face <input type="checkbox"/> Cart./Canister <input type="checkbox"/> Full Face <input type="checkbox"/> Cart./Canister <input type="checkbox"/> PAPR <input type="checkbox"/> Cart./Canister <input type="checkbox"/> Type C <input type="checkbox"/> Fall Protection <input type="checkbox"/> Flotation <input type="checkbox"/> Other	<b>Task(s):</b> <input type="checkbox"/> Head <input type="checkbox"/> Eye and Face <input type="checkbox"/> Hearing <input type="checkbox"/> Arms and Legs Only <input type="checkbox"/> Whole Body <input type="checkbox"/> Apron <input type="checkbox"/> Hand - Gloves <input type="checkbox"/> Gloves <input type="checkbox"/> Gloves <input type="checkbox"/> Foot - Safety Boots <input type="checkbox"/> Outer Boots <input type="checkbox"/> Boots (Other) <hr/> <input type="checkbox"/> SAR - Airline <input type="checkbox"/> SCBA <input type="checkbox"/> Comb. Airline/SCBA <input type="checkbox"/> Cascade System <input type="checkbox"/> Compressor <input type="checkbox"/> Fall Protection <input type="checkbox"/> Flotation <input type="checkbox"/> Other

#### **4. MONITORING PROGRAM**



## 4.1 SITE OR PROJECT MONITORING PROGRAM

### 4.1.1 Air Monitoring Instruments

#### Instrument Selection and Initial Check Record

Reporting Format: ☒ Field Notebook ☐ Field Data Sheets\* ☐ Air Monitoring Log ☐ Trip Report ☐ Other

Instrument	Task No.(s)	Number Required	Number Received	Checked Upon Receipt	Comment	Initials
<input type="checkbox"/> CGI				<input type="checkbox"/>		
<input type="checkbox"/> O <sub>2</sub>				<input type="checkbox"/>		
<input type="checkbox"/> CGI/O <sub>2</sub>				<input type="checkbox"/>		
<input type="checkbox"/> CGI/O <sub>2</sub> /tox-PPM, H <sub>2</sub> S, H <sub>2</sub> S/CO				<input type="checkbox"/>		
<input type="checkbox"/> RAD				<input type="checkbox"/>		
<input type="checkbox"/> GM (Pancake)				<input type="checkbox"/>		
<input type="checkbox"/> NaI (Micro R)				<input type="checkbox"/>		
<input type="checkbox"/> ZnS (Alpha Scintillator)				<input type="checkbox"/>		
<input type="checkbox"/> Other				<input type="checkbox"/>		
<input checked="" type="checkbox"/> PID	1-4	1*		<input type="checkbox"/>		
<input checked="" type="checkbox"/> HNu 10.2				<input type="checkbox"/>		
<input type="checkbox"/> HNu 11.7				<input type="checkbox"/>		
<input type="checkbox"/> Photovac, TMA				<input type="checkbox"/>		
<input type="checkbox"/> OVM				<input type="checkbox"/>		
<input type="checkbox"/> Other				<input type="checkbox"/>		
<input type="checkbox"/> FID				<input type="checkbox"/>		
<input type="checkbox"/> Fox 128				<input type="checkbox"/>		
<input type="checkbox"/> Heath, AID, Other				<input type="checkbox"/>		
<input type="checkbox"/> RAM, Mini-RAM, Other _____				<input type="checkbox"/>		
<input type="checkbox"/> Monitox				<input type="checkbox"/>		
Specify: _____				<input type="checkbox"/>		
<input type="checkbox"/> Personal Sampling				<input type="checkbox"/>		
Specify: _____				<input type="checkbox"/>		
<input type="checkbox"/> Bio-Aerosol Monitor				<input type="checkbox"/>		
<input checked="" type="checkbox"/> Pump - MSA, Dräger, Sensidyne	1-4	1*		<input type="checkbox"/>	Draeger for Vinyl Chloride	
<input type="checkbox"/> Tubes/type: _____				<input type="checkbox"/>		
<input type="checkbox"/> Tubes/type: _____				<input type="checkbox"/>		
<input type="checkbox"/> Other				<input type="checkbox"/>		

\* -Additional instruments may be necessary if multiple drilling rigs are onsite.

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RFW251-2D-AWBH

#### 4.1 SITE OR PROJECT HAZARD MONITORING PROGRAM

#### 4.1.2 Air Monitoring Instruments Calibration Record

[illegible]



## 4.2 SITE AIR MONITORING PROGRAM

### Action Levels

These Action Levels, if not defined by regulation, are some percent (usually 50%) of the applicable PEL/TLV/REL. That number must also be adjusted to account for instrument response factors.

	Tasks	Action Level		Action
<input type="checkbox"/> Explosive atmosphere		Ambient Air Concentration	Confined Space Concentration	
		<10% LEL	0 to 1% LEL	Work may continue. Consider toxicity potential.
		10 to 25% LEL	1 to 10% LEL	Work may continue. Increase monitoring frequency.
		>25% LEL	>10% LEL	Work must stop. Ventilate area before returning.
<input type="checkbox"/> Oxygen		Ambient Air Concentration	Confined Space Concentration	
		<19.5% O <sub>2</sub>	<19.5% O <sub>2</sub>	Leave area. Re-enter only with self-contained breathing apparatus.
		19.5% to 25% O <sub>2</sub>	19.5% to 23.5% O <sub>2</sub>	Work may continue. Investigate changes from 21%.
		>25% O <sub>2</sub>	>23.5% O <sub>2</sub>	Work must stop. Ventilate area before returning.
<input type="checkbox"/> Radiation				
<input checked="" type="checkbox"/> Organic gases and vapors	All	Level D = <0.5 (PEL for vinyl chloride). If VC is ruled out with draeger tubes, level D = <10ppm. If greater than 10ppm above background, stop work and reevaluate		Continue Work Stop Work
<input type="checkbox"/> Inorganic gases, vapors, and particulates		Background > Background		Continue Work Stop Work, Reassess

### **4.3 ACTION LEVELS**

**(attach calculations, benzene protocol, or modified benzene protocol as necessary)**

## **5. HOSPITAL INFORMATION**



5.1 EMERGENCIES		
5.1.1 Emergency Contacts and Phone Numbers		
Agency	Contact	Phone Number
Local Medical Emergency Facility (LMF)	Advocate Good Samaritan Hospital	630-275-5900
WESTON Medical Emergency Contact	Qualisys-Dr. Sandra Dorsey	800-874-4676
WESTON Health and Safety	Corporate Health and Safety	610-701-3000
WESTON Health and Safety	TBD	TBD
Fire Department	Downers Grove Fire Department	630-434-5980
Police Department	Downers Grove Police Department	630-434-5600
On-Site Coordinator- SHSC	TBD	TBD
Client Site Contact	TBD	TBD
Site Telephone	TBD	TBD
Nearest Telephone	TBD	TBD

Local Medical Emergency Facility(s)		
Name of Hospital: Advocate Good Samaritan Hospital		
Address: 3815 Highland Avenue #1002, Downers Grove, IL 60515		Phone No.: 630-275-5900
Name of Contact: Emergency Room		Phone No.: 630-275-5900
<b>Type of Service:</b> <input type="checkbox"/> Physical trauma only <input type="checkbox"/> Chemical exposure only <input checked="" type="checkbox"/> Physical trauma and chemical exposure <input checked="" type="checkbox"/> Available 24 hours	<b>Route to Hospital:</b> (See Attached) SEE NEXT SHEET FOR DIRECTIONS FROM EACH SITE	<b>Travel time from site:</b> VARIES <b>Distance to hospital:</b> VARIES <b>Name/no. of 24-hr ambulance service:</b> 911

Secondary or Specialty Service Provider		
Name of Hospital:		
Address:		Phone No.:
Name of Contact:		Phone No.:
<b>Type of Service:</b> <input type="checkbox"/> Physical trauma only <input type="checkbox"/> Chemical exposure only <input type="checkbox"/> Physical trauma and chemical exposure <input type="checkbox"/> Available 24 hours	<b>Route to Hospital (see attached):</b>	<b>Travel time from site:</b>  <b>Distance to hospital:</b>  <b>Name/no. of 24-hr ambulance service:</b>

See reporting an incident in Attachment F.

**Route to hospital from Study Area A:**

Start out going East on CURTISS ST toward CHASE AVE  
Turn LEFT onto BELMONT RD  
Turn RIGHT onto OGDEN AVE/US-34  
Turn LEFT onto MAIN ST/CR-9

**Route to hospital from Study Area B:**

Start out going Southwest on CHASE AVE toward CURTISS ST  
Turn LEFT onto CURTISS ST  
Turn LEFT onto BELMONT RD  
Turn RIGHT onto OGDEN AVE/US-34  
Turn LEFT onto MAIN ST/CR-9

**Route to hospital from Study Area C:**

Start out going Southwest on CHASE AVE toward CURTISS ST  
Turn LEFT onto CURTISS ST  
Turn LEFT onto BELMONT RD  
Turn RIGHT onto OGDEN AVE/US-34  
Turn LEFT onto MAIN ST/CR-9

**Route to hospital from Study Area D:**

Start out going North on JANES AVE toward WISCONSIN ST  
Turn RIGHT onto WISCONSIN ST  
Turn LEFT onto BELMONT RD  
Turn RIGHT onto OGDEN AVE/US-34  
Turn LEFT onto MAIN ST/CR-9

**Route to hospital from Study Area E:**

Start out going East on WISCONSIN ST toward BELMONT RD  
Turn LEFT onto BELMONT RD  
Turn RIGHT onto OGDEN AVE/US-34  
Turn LEFT onto MAIN ST/CR-9

**Route to hospital from Study Area F:**

Start out going East on WISCONSIN ST toward KATRINE AVE  
Turn LEFT onto BELMONT RD  
Turn RIGHT onto OGDEN AVE/US-34  
Turn LEFT onto MAIN ST/CR-9

**Route to hospital from Study Area G:**

Start out going North on KATRINE AVE toward CURTISS ST  
Turn Right onto CURTISS ST  
Turn LEFT onto BELMONT RD  
Turn RIGHT onto OGDEN AVE/US-34  
Turn LEFT onto MAIN ST/CR-9

**Route to hospital from Study Area H:**

Start out going North on WALNUT AVE toward CURTISS ST  
Turn Right onto CURTISS ST  
Turn LEFT onto BELMONT RD  
Turn RIGHT onto OGDEN AVE/US-34  
Turn LEFT onto MAIN ST/CR-9

**Route to hospital from Study Area I:**

Start out going East on WISCONSIN ST toward JANES AVE  
Turn LEFT onto BELMONT RD  
Turn RIGHT onto OGDEN AVE/US-34  
Turn LEFT onto MAIN ST/CR-9

**Route to hospital from Study Area J:**

Start out going East on HITCHCOCK AVE toward WALNUT AVE  
Turn Right onto WALNUT AVE  
Turn LEFT onto BELMONT RD  
Turn RIGHT onto OGDEN AVE/US-34  
Turn LEFT onto MAIN ST/CR-9

**Route to hospital from Study Area K:**

Start out going North on BELMONT RD toward CURTISS ST  
Turn RIGHT onto OGDEN AVE/US-34  
Turn LEFT onto MAIN ST/CR-9

**Route to hospital from 2500 Curtiss Street:**

Start out going East on CURTISS ST toward CHASE AVE  
Turn LEFT onto BELMONT RD  
Turn RIGHT onto OGDEN AVE/US-34  
Turn LEFT onto MAIN ST/CR-9

**Route to hospital from Property South of the Intersection of Curtiss Street and Glenview and East of Belmont:**

Start out going East on CURTISS ST toward KATRINE AVE  
Turn LEFT onto BELMONT RD  
Turn RIGHT onto OGDEN AVE/US-34  
Turn LEFT onto MAIN ST/CR-9

**Route to hospital from Shopping Mall Parking Lot South of 63<sup>rd</sup> Street between Belmont and Woodward:**

Start out going North on WOODWARD AVE toward 61<sup>st</sup> ST  
Turn RIGHT onto MAPLE AVE/CR-17  
Turn LEFT onto DUNHAM RD  
Turn LEFT onto MAIN ST/CR-9

**Route to hospital from Intersection of I-355 and 63<sup>rd</sup> Street:**

Start out going East on 63<sup>rd</sup> ST/CR-38E toward CR-38W  
Turn LEFT onto BELMONT RD  
Turn RIGHT onto MAPLE AVE/CR-17  
Turn LEFT onto DUNHAM RD  
Turn LEFT onto MAIN ST/CR-9

**Route to hospital from Near Hanson Road between Lee Street and Springside Avenue:**

Start out going East on MAPLE AVE/CR-17 toward AUBREY TER  
Turn LEFT onto DUNHAM RD  
Turn LEFT onto MAIN ST/CR-9

**Route to hospital from Pershing Road halfway between 59<sup>th</sup> Street and Maple Avenue:**

Start out going West on MAPLE AVE/CR-17 toward HILLCREST AVE  
Turn RIGHT onto BELMONT RD  
Turn RIGHT onto OGDEN AVE/US-34  
Turn LEFT onto MAIN ST/CR-9



### **5.1.2 Hospital Map**

(attach hospital map and directions)

# MAPQUEST

**Start:** 63rd St & Woodward Ave  
Downers Grove, IL 60516, US

**End:** Advocate Good Samaritan Hosp: 630-275-5900  
3815 Highland Ave # 1002,  
Downers Grove, IL 60515, US

## Notes:








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**Cloud Nine.**  
The new Hampton  
bed experience.  
Coming to all hotels  
by December 2008  
**BOOK NOW**  
Hampton  
A HILTON HOTEL

## Directions

## Distance

**Total Est. Time:** 12 minutes

**Total Est. Distance:** 4.15 miles

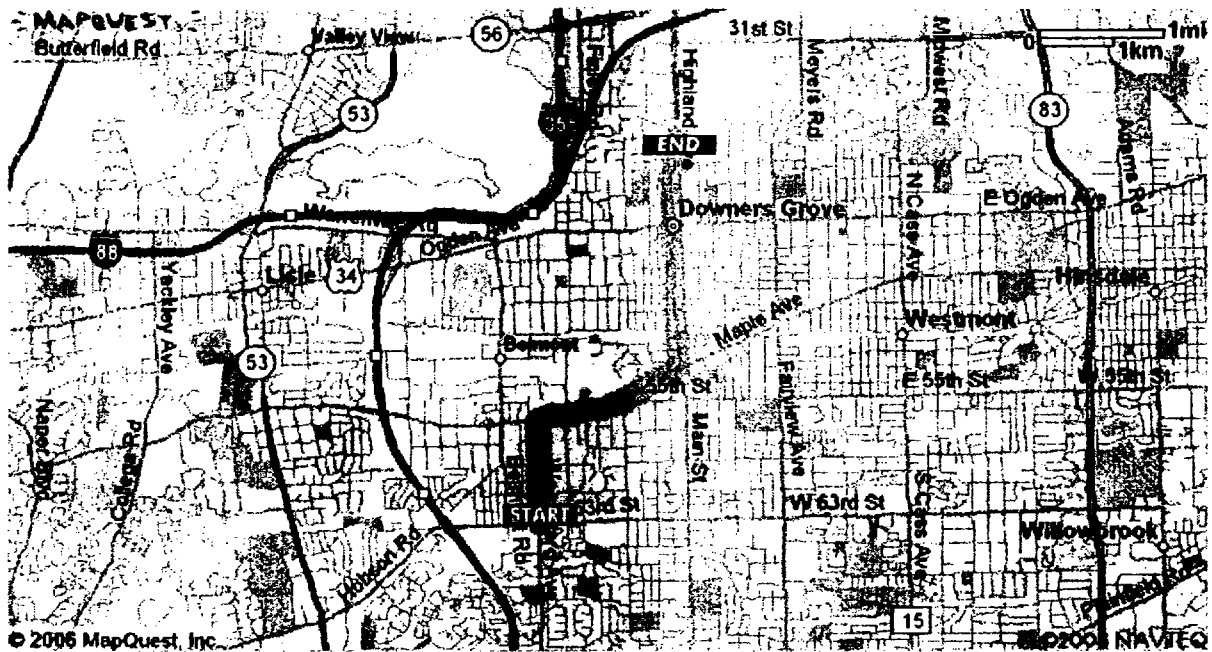
- |   |   |            |
|---|---|------------|
| <b>START</b>  | <b>1:</b> Start out going NORTH on WOODWARD AVE toward 61ST ST.   | 0.8 miles  |
|   | <b>2:</b> Turn RIGHT onto MAPLE AVE / CR-17.  | 0.7 miles  |
|  | <b>3:</b> Turn LEFT onto DUNHAM RD.   | <0.1 miles |
|  | <b>4:</b> DUNHAM RD becomes MAPLE AVE.  | 0.5 miles  |
|  | <b>5:</b> Turn LEFT onto MAIN ST.   | 1.7 miles  |
|  | <b>6:</b> MAIN ST becomes HIGHLAND AVE / CR-9.  | 0.2 miles  |
| <b>END</b>  | <b>7:</b> End at <b>Advocate Good Samaritan Hosp</b><br>3815 Highland Ave # 1002, Downers Grove, IL 60515, US |            |

**Total Est. Time:** 12 minutes

**Total Est. Distance:** 4.15 miles

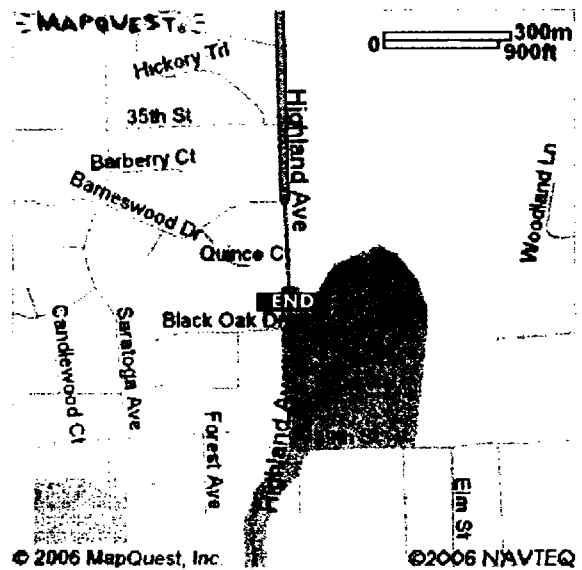
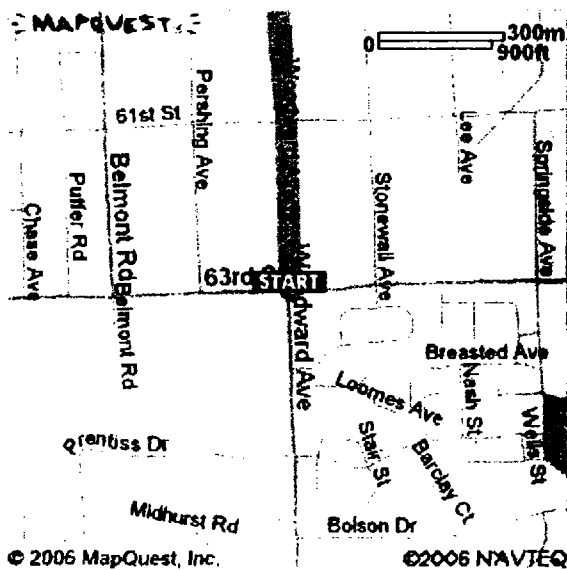


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**Start:**  
**63rd St & Woodward Ave**  
 Downers Grove, IL 60516, US

**End:**  
**Advocate Good Samaritan Hosp:**  
 630-275-5900  
 3815 Highland Ave # 1002, Downers  
 Grove, IL 60515, US



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# MAPQUEST

**Start:** 2710 Curtiss St  
Downers Grove, IL 60515-4001,  
US

**End:** Advocate Good Samaritan  
Hosp: 630-275-5900  
3815 Highland Ave # 1002,  
Downers Grove, IL 60515, US

## Notes:

• THE AMOCO •  
**ROAD TOUR**  
SWEEPSTAKES



**ENTER NOW**

YOU COULD WIN A TRIP FOR 4  
TO ONE OF 5 DESTINATIONS

## Directions

## Distance

**Total Est. Time:** 9 minutes

**Total Est. Distance:** 3.73 miles

START

**1:** Start out going EAST on CURTISS ST toward KATRINE AVE. 0.5 miles



**2:** Turn LEFT onto BELMONT RD. 0.9 miles



**3:** Turn RIGHT onto OGDEN AVE / US-34. 1.4 miles



**4:** Turn LEFT onto MAIN ST / CR-9. Continue to follow CR-9. 0.7 miles

END

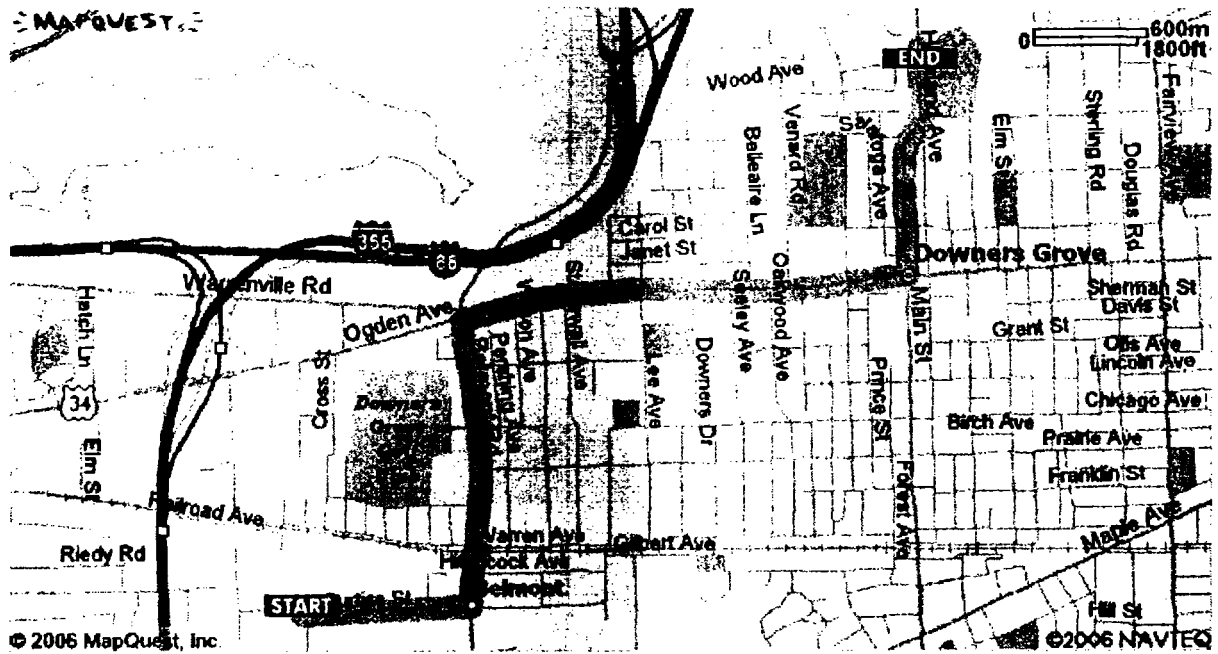
**5:** End at **Advocate Good Samaritan Hosp**  
3815 Highland Ave # 1002, Downers Grove, IL 60515, US

**Total Est. Time:** 9 minutes

**Total Est. Distance:** 3.73 miles

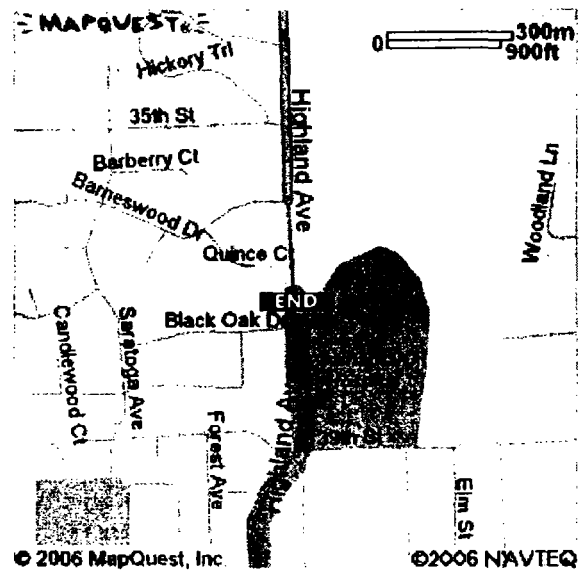
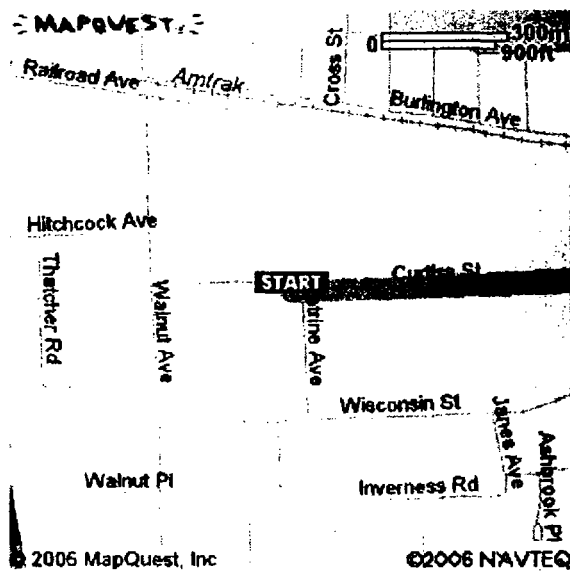


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**Start:**  
**2710 Curtiss St**  
 Downers Grove, IL 60515-4001, US

**End:**  
**Advocate Good Samaritan Hosp:**  
 630-275-5900  
 3815 Highland Ave # 1002, Downers  
 Grove, IL 60515, US



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# MAPQUEST

**Start:** 2500 Curtiss St  
Downers Grove, IL 60515-4058,  
US

**End:** Advocate Good Samaritan  
Hosp: 630-275-5900  
3815 Highland Ave # 1002,  
Downers Grove, IL 60515, US

## Notes:

• THE AMOCO •  
**ROAD! TOUR**  
SWEEPSTAKES



**ENTER NOW**

YOU COULD WIN A TRIP FOR 4  
TO ONE OF 5 DESTINATIONS

## Directions

## Distance

**Total Est. Time:** 9 minutes

**Total Est. Distance:** 3.52 miles

START

**1:** Start out going EAST on CURTISS ST toward CHASE AVE.

0.3 miles



**2:** Turn LEFT onto BELMONT RD.

0.9 miles



**3:** Turn RIGHT onto OGDEN AVE / US-34.

1.4 miles



**4:** Turn LEFT onto MAIN ST / CR-9. Continue to follow CR-9.

0.7 miles

END

**5:** End at Advocate Good Samaritan Hosp

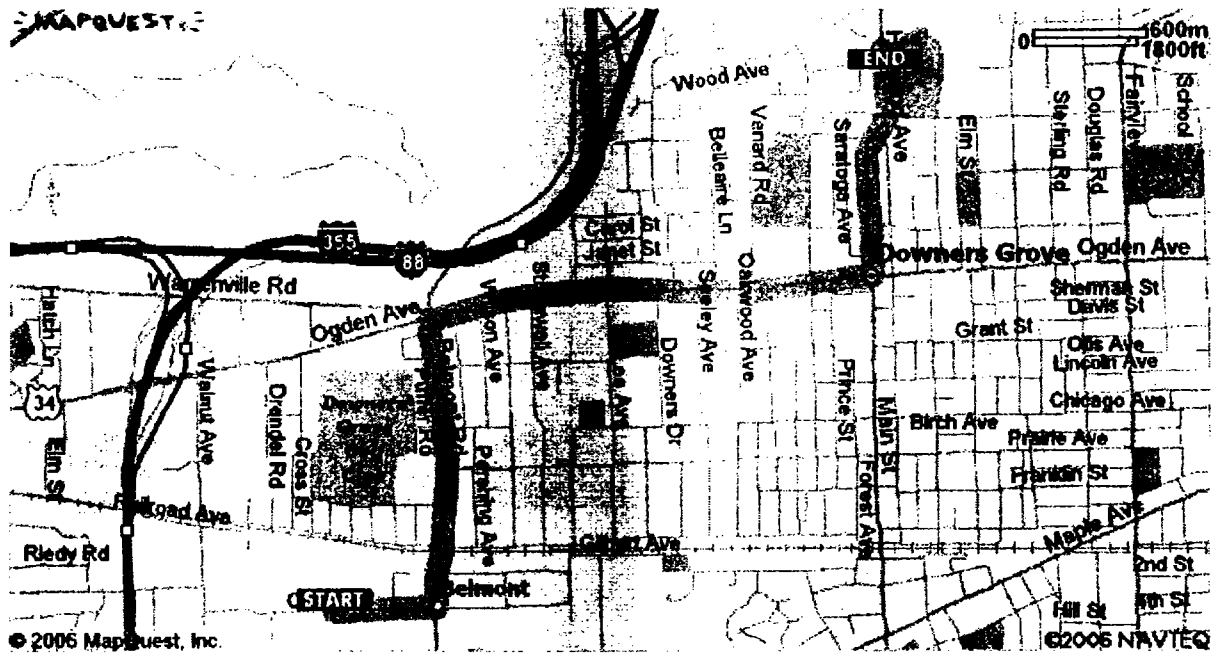
3815 Highland Ave # 1002, Downers Grove, IL 60515, US

**Total Est. Time:** 9 minutes

**Total Est. Distance:** 3.52 miles

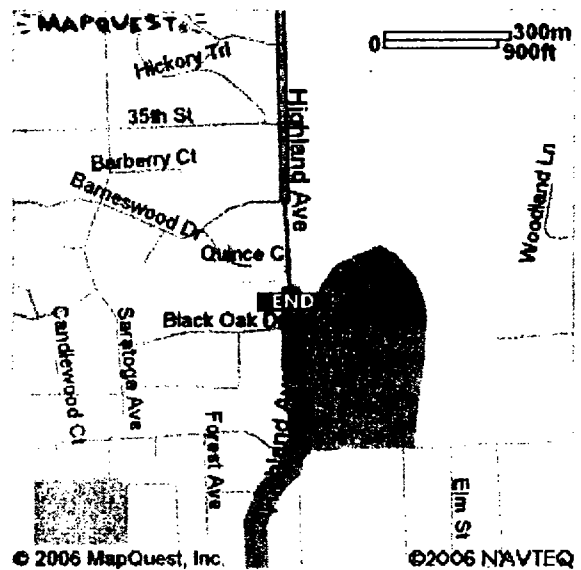
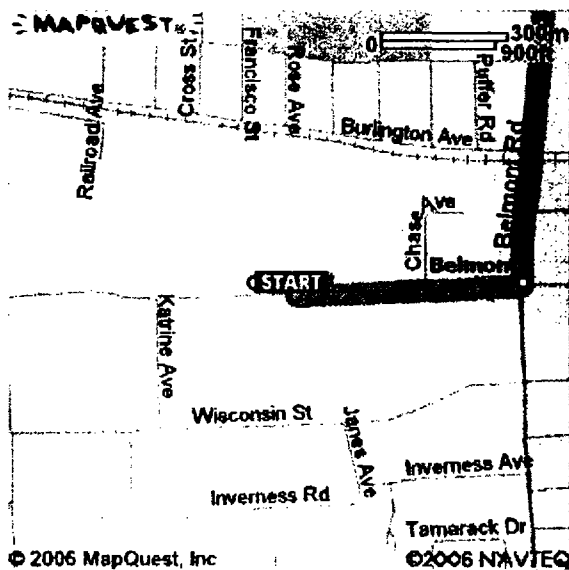


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**Start:**  
**2500 Curtiss St**  
 Downers Grove, IL 60515-4058, US

**End:**  
**Advocate Good Samaritan Hosp:**  
 630-275-5900  
 3815 Highland Ave # 1002, Downers  
 Grove, IL 60515, US



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# MAPQUEST

**Start:** Lee Ave & Maple Ave  
Downers Grove, IL 60515, US

**End:** Advocate Good Samaritan  
Hosp: 630-275-5900  
3815 Highland Ave # 1002,  
Downers Grove, IL 60515, US

## Notes:

• THE AMOCO

ULTIMATE<sup>®</sup>



ROAD! TOUR

SWEEPSTAKES

ENTER NOW

YOU COULD WIN A TRIP FOR 4  
TO ONE OF 5 DESTINATIONS

## Directions

## Distance

**Total Est. Time:** 8 minutes

**Total Est. Distance:** 3.00 miles

START

**1:** Start out going EAST on MAPLE AVE / CR-17 toward AUBREY TER.

0.4 miles



**2:** Turn LEFT onto DUNHAM RD.

<0.1 miles



**3:** DUNHAM RD becomes MAPLE AVE.

0.5 miles



**4:** Turn LEFT onto MAIN ST.

1.7 miles



**5:** MAIN ST becomes HIGHLAND AVE / CR-9.

0.2 miles

END

**6:** End at Advocate Good Samaritan Hosp

3815 Highland Ave # 1002, Downers Grove, IL 60515, US

**Total Est. Time:** 8 minutes

**Total Est. Distance:** 3.00 miles



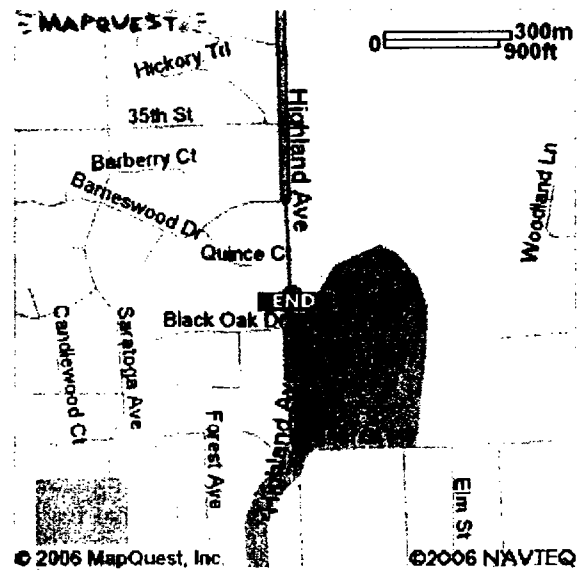
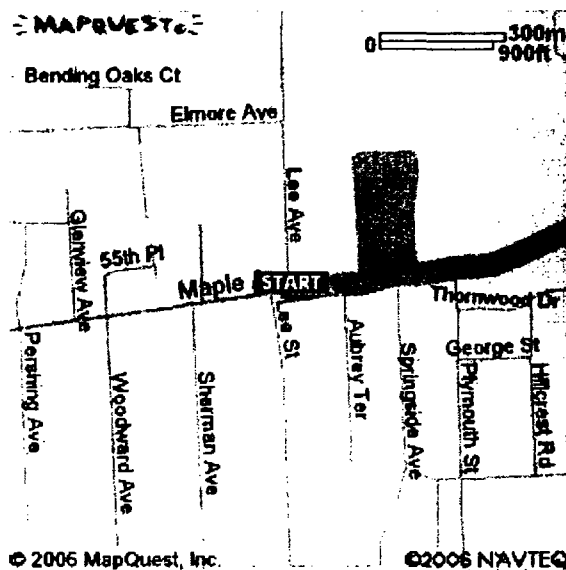
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**Start:**  
**Lee Ave & Maple Ave**  
 Downers Grove, IL 60515, US

**End:**  
**Advocate Good Samaritan Hosp:**  
 630-275-5900  
 3815 Highland Ave # 1002, Downers  
 Grove, IL 60515, US



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**Start:** I 355 & 63rd St  
Downers Grove, IL 60515, US

**End:** Advocate Good Samaritan  
Hosp: 630-275-5900  
3815 Highland Ave # 1002,  
Downers Grove, IL 60515, US

**Notes:**



#### Directions

#### Distance

**Total Est. Time:** 13 minutes

**Total Est. Distance:** 4.85 miles

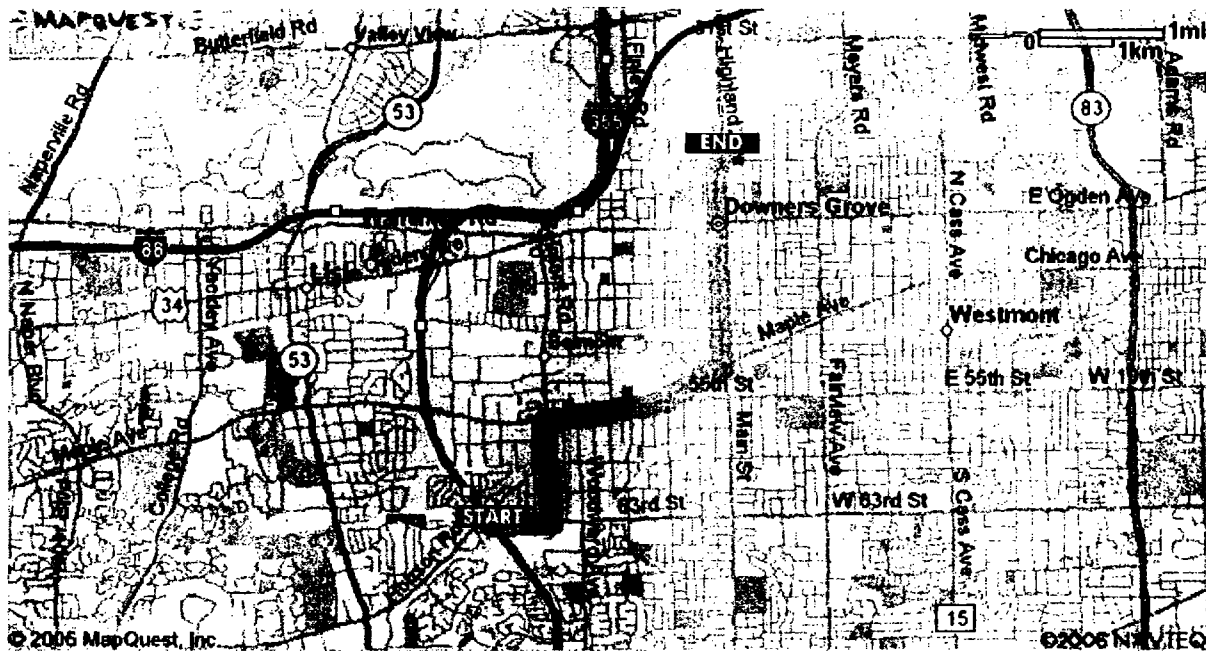
- START**
- 1:** Start out going EAST on 63RD ST / CR-38 E toward CR-38 W. 0.4 miles
  - 2:** Turn LEFT onto BELMONT RD. 0.8 miles
  - 3:** Turn RIGHT onto MAPLE AVE / CR-17. 0.9 miles
  - 4:** Turn LEFT onto DUNHAM RD. <0.1 miles
  - 5:** DUNHAM RD becomes MAPLE AVE. 0.5 miles
  - 6:** Turn LEFT onto MAIN ST. 1.7 miles
  - 7:** MAIN ST becomes HIGHLAND AVE / CR-9. 0.2 miles
  - 8:** End at Advocate Good Samaritan Hosp  
3815 Highland Ave # 1002, Downers Grove, IL 60515, US
- END**

**Total Est. Time:** 13 minutes

**Total Est. Distance:** 4.85 miles

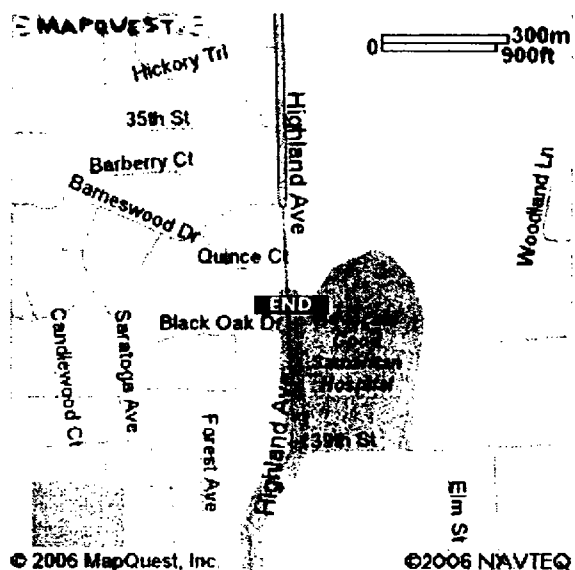
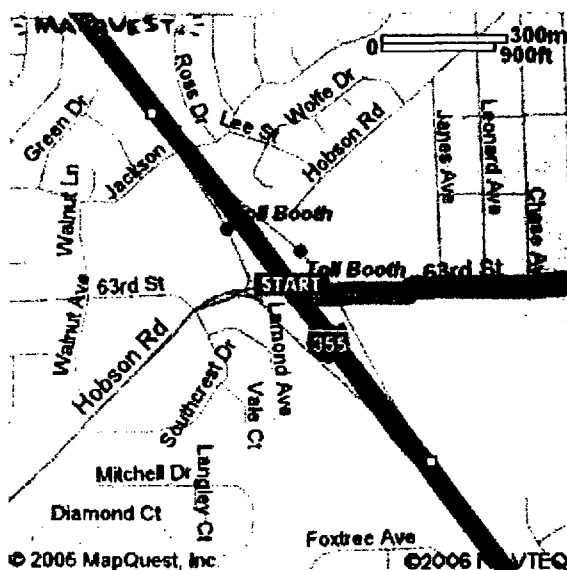


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**Start:**  
**I 355 & 63rd St**  
 Downers Grove, IL 60515, US

**End:**  
**Advocate Good Samaritan Hosp:**  
 630-275-5900  
 3815 Highland Ave # 1002, Downers  
 Grove, IL 60515, US



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**Start:** 2400 Curtiss St  
Downers Grove, IL 60515-4056,  
US

**End:** Advocate Good Samaritan  
Hosp: 630-275-5900  
3815 Highland Ave # 1002,  
Downers Grove, IL 60515, US

**Notes:**

Travel while it's hot.  
Save at least 20% on summer flights.

SEARCH FARES

AOL TRAVEL

**Directions**

**Distance**

**Total Est. Time:** 8 minutes

**Total Est. Distance:** 3.42 miles

START

**1:** Start out going EAST on CURTISS ST toward CHASE AVE.

0.2 miles



**2:** Turn LEFT onto BELMONT RD.

0.9 miles



**3:** Turn RIGHT onto OGDEN AVE / US-34.

1.4 miles



**4:** Turn LEFT onto MAIN ST / CR-9. Continue to follow CR-9.

0.7 miles

END

**5:** End at Advocate Good Samaritan Hosp

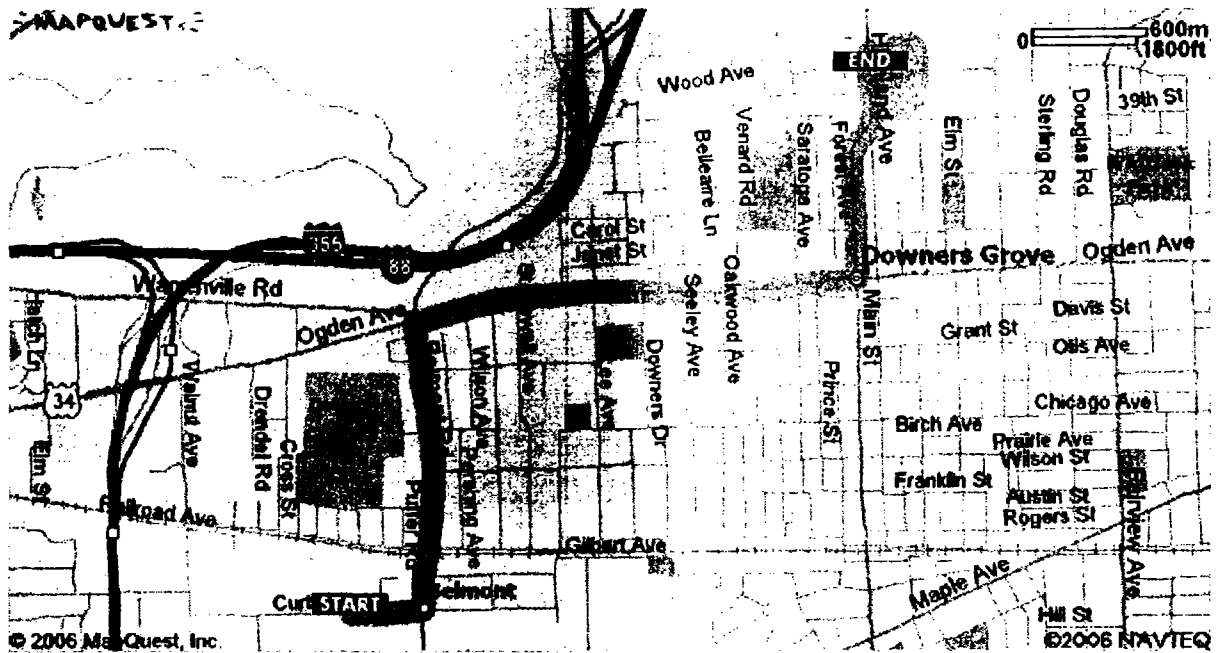
3815 Highland Ave # 1002, Downers Grove, IL 60515, US

**Total Est. Time:** 8 minutes

**Total Est. Distance:** 3.42 miles

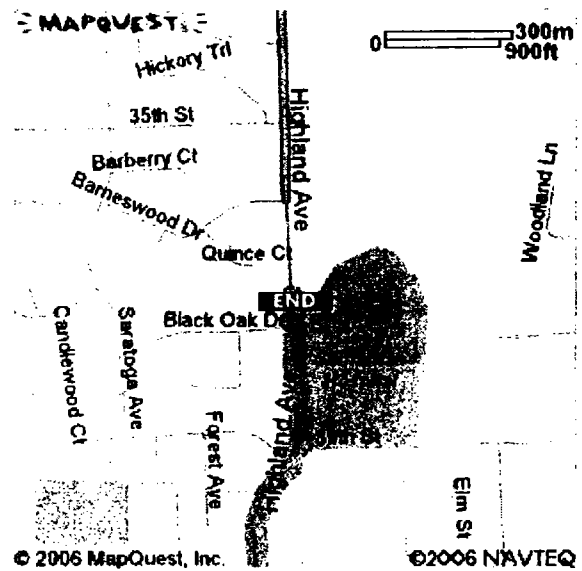
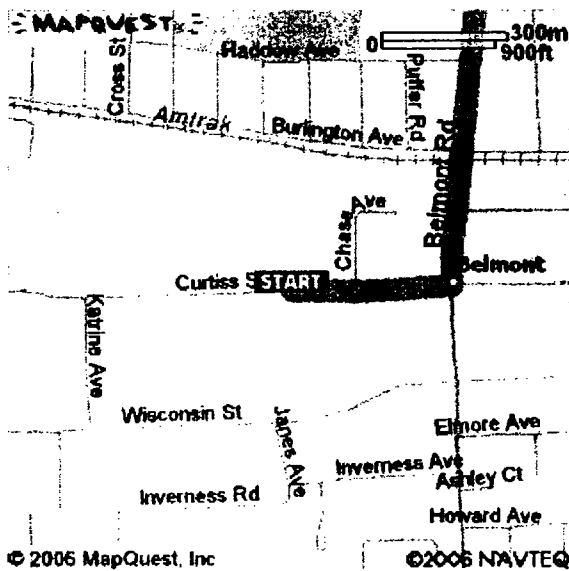


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**Start:**  
**2400 Curtiss St**  
 Downers Grove, IL 60515-4056, US

**End:**  
**Advocate Good Samaritan Hosp:**  
 630-275-5900  
 3815 Highland Ave # 1002, Downers  
 Grove, IL 60515, US



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# MAPQUEST

**Start:** [5000-5015] Chase Ave  
Downers Grove, IL 60515, US

**End:** Advocate Good Samaritan  
Hosp: 630-275-5900  
3815 Highland Ave # 1002,  
Downers Grove, IL 60515, US

## Notes:

Travel while it's hot.  
Save at least 20% on summer flights.

SEARCH FLIGHTS





AOL TRAVEL

## Directions

## Distance

**Total Est. Time:** 9 minutes

**Total Est. Distance:** 3.45 miles

- |   |   |           |
|---|---|-----------|
| <b>START</b>  | <b>1:</b> Start out going SOUTHWEST on CHASE AVE toward CURTISS ST.   | 0.1 miles |
|   | <b>2:</b> Turn LEFT onto CURTISS ST.  | 0.1 miles |
|  | <b>3:</b> Turn LEFT onto BELMONT RD.  | 0.9 miles |
|  | <b>4:</b> Turn RIGHT onto OGDEN AVE / US-34.  | 1.4 miles |
|  | <b>5:</b> Turn LEFT onto MAIN ST / CR-9. Continue to follow CR-9.   | 0.7 miles |
| <b>END</b>  | <b>6:</b> End at <b>Advocate Good Samaritan Hosp</b><br>3815 Highland Ave # 1002, Downers Grove, IL 60515, US |           |

**Total Est. Time:** 9 minutes

**Total Est. Distance:** 3.45 miles



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# MAPQUEST

**Start:** Curtiss St & Chase Ave  
Downers Grove, IL 60515, US

**End:** Advocate Good Samaritan  
Hosp: 630-275-5900  
3815 Highland Ave # 1002,  
Downers Grove, IL 60515, US

## Notes:

Travel while it's hot.  
Save at least 20% on summer flights.

SAFE FLIGHTS

AOL TRAVEL

## Directions

## Distance

**Total Est. Time:** 8 minutes

**Total Est. Distance:** 3.34 miles



**1:** Start out going SOUTHWEST on CHASE AVE toward CURTISS ST.

<0.1 miles



**2:** Turn LEFT onto CURTISS ST.

0.1 miles



**3:** Turn LEFT onto BELMONT RD.

0.9 miles



**4:** Turn RIGHT onto OGDEN AVE / US-34.

1.4 miles



**5:** Turn LEFT onto MAIN ST / CR-9. Continue to follow CR-9.

0.7 miles



**6:** End at **Advocate Good Samaritan Hosp**

3815 Highland Ave # 1002, Downers Grove, IL 60515, US

**Total Est. Time:** 8 minutes

**Total Est. Distance:** 3.34 miles



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# MAPQUEST

**Start:** Wisconsin Ave & Janes Ave  
Downers Grove, IL 60515, US

**End:** Advocate Good Samaritan  
Hosp: 630-275-5900  
3815 Highland Ave # 1002,  
Downers Grove, IL 60515, US

## Notes:

## Directions

## Distance

**Total Est. Time:** 9 minutes

**Total Est. Distance:** 3.62 miles

START

**1:** Start out going NORTH on JANES AVE toward WISCONSIN ST.

<0.1 miles



**2:** Turn RIGHT onto WISCONSIN ST.

0.2 miles



**3:** Turn LEFT onto BELMONT RD.

1.1 miles



**4:** Turn RIGHT onto OGDEN AVE / US-34.

1.4 miles



**5:** Turn LEFT onto MAIN ST / CR-9. Continue to follow CR-9.

0.7 miles

END

**6:** End at Advocate Good Samaritan Hosp

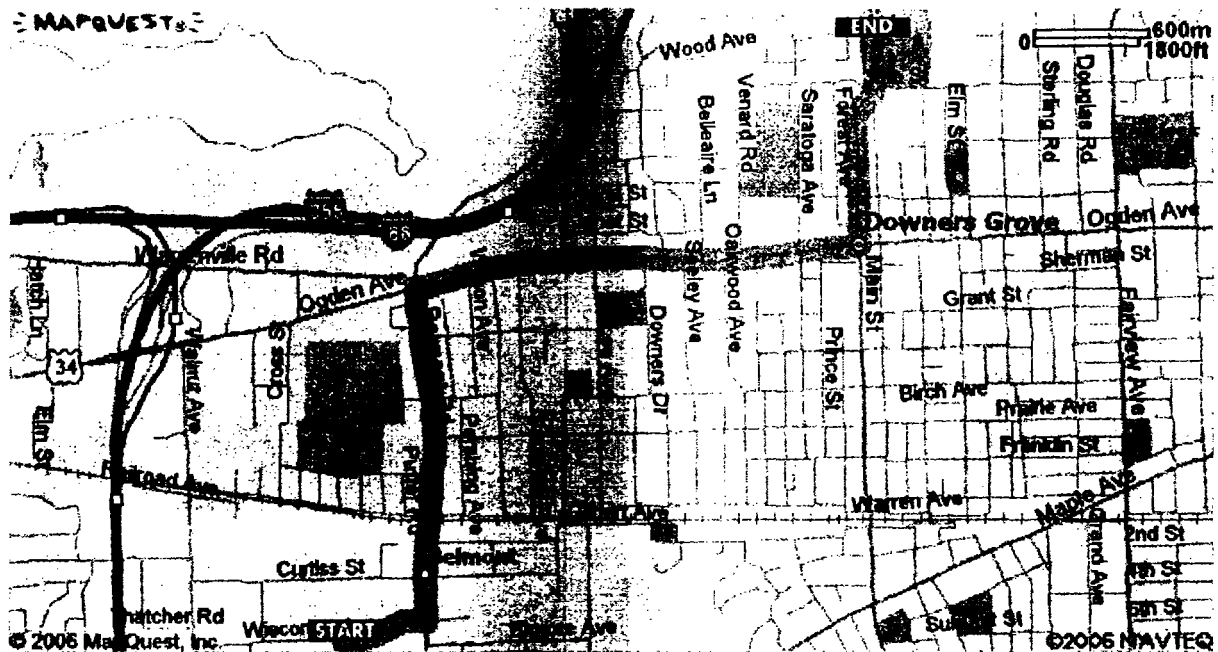
3815 Highland Ave # 1002, Downers Grove, IL 60515, US

**Total Est. Time:** 9 minutes

**Total Est. Distance:** 3.62 miles

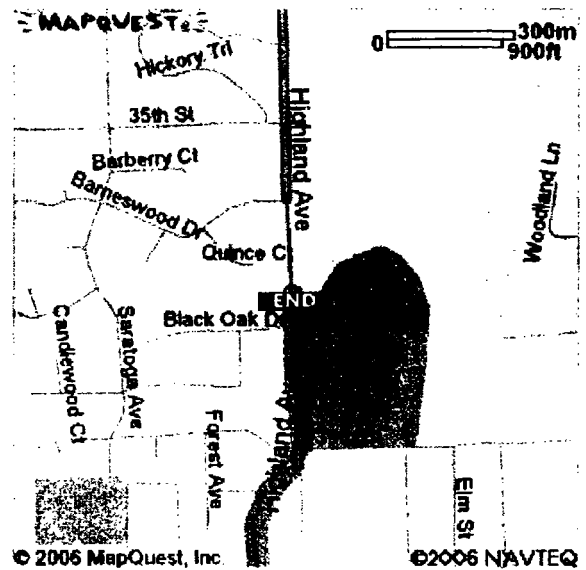
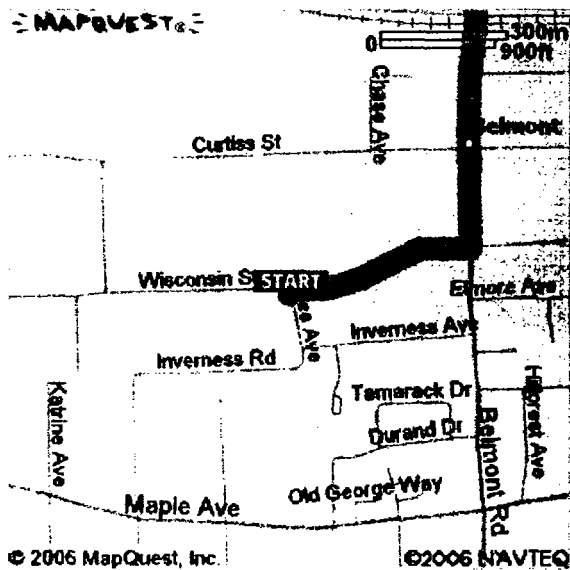


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**Start:**  
**Wisconsin Ave & Janes Ave**  
 Downers Grove, IL 60515, US

**End:**  
**Advocate Good Samaritan Hosp:**  
 630-275-5900  
 3815 Highland Ave # 1002, Downers  
 Grove, IL 60515, US



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# MAPQUEST

**Start:** 2400 Wisconsin Ave  
Downers Grove, IL 60515-4019,  
US

**End:** Advocate Good Samaritan  
Hosp: 630-275-5900  
3815 Highland Ave # 1002,  
Downers Grove, IL 60515, US

## Notes:

Travel while it's hot.  
Save at least 20% on summer flights.

STAYC HAWES

AOL travel

## Directions

## Distance

**Total Est. Time:** 9 minutes

**Total Est. Distance:** 3.61 miles

START

**1:** Start out going EAST on WISCONSIN ST toward BELMONT RD.

0.2 miles



**2:** Turn LEFT onto BELMONT RD.

1.1 miles



**3:** Turn RIGHT onto OGDEN AVE / US-34.

1.4 miles



**4:** Turn LEFT onto MAIN ST / CR-9. Continue to follow CR-9.

0.7 miles

END

**5:** End at Advocate Good Samaritan Hosp

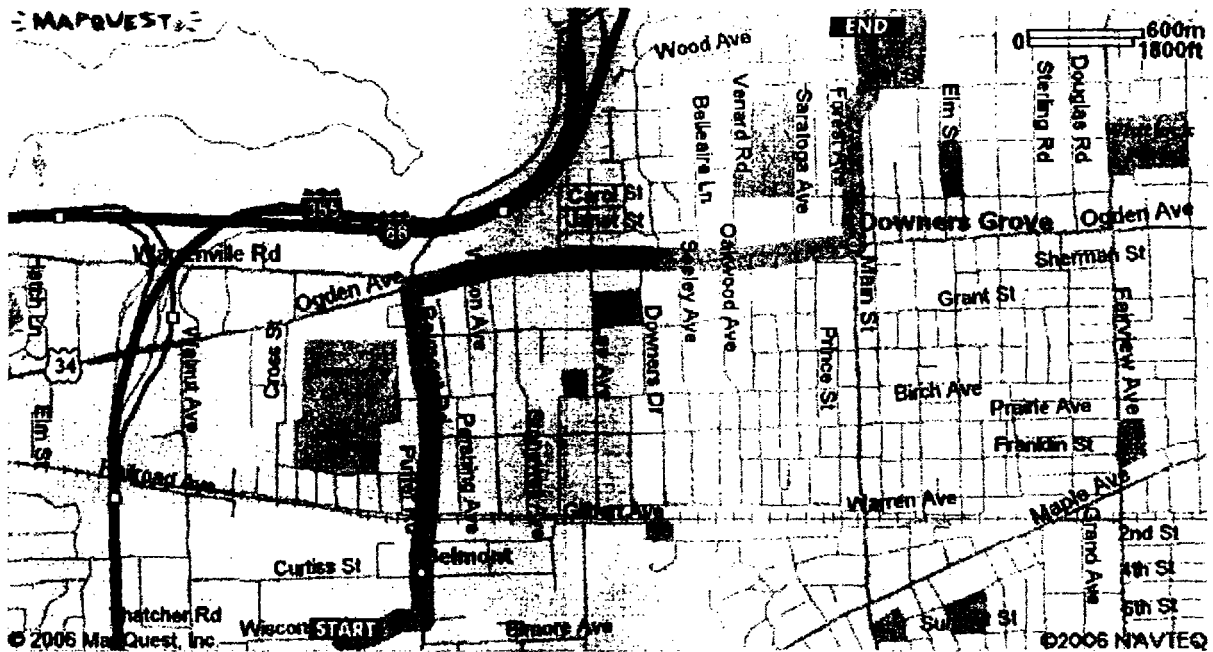
3815 Highland Ave # 1002, Downers Grove, IL 60515, US

**Total Est. Time:** 9 minutes

**Total Est. Distance:** 3.61 miles

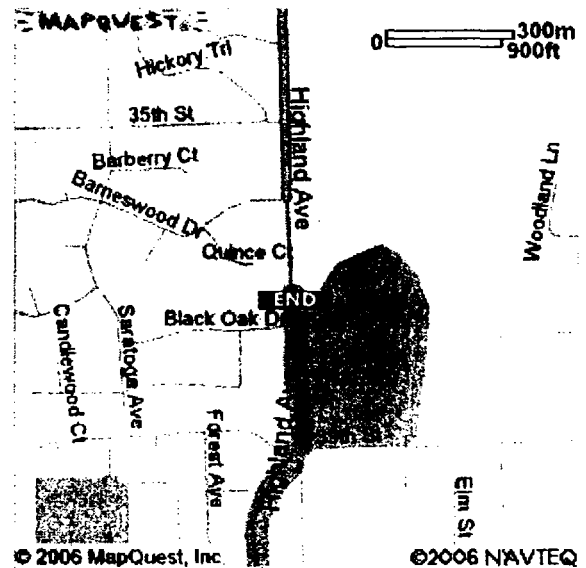
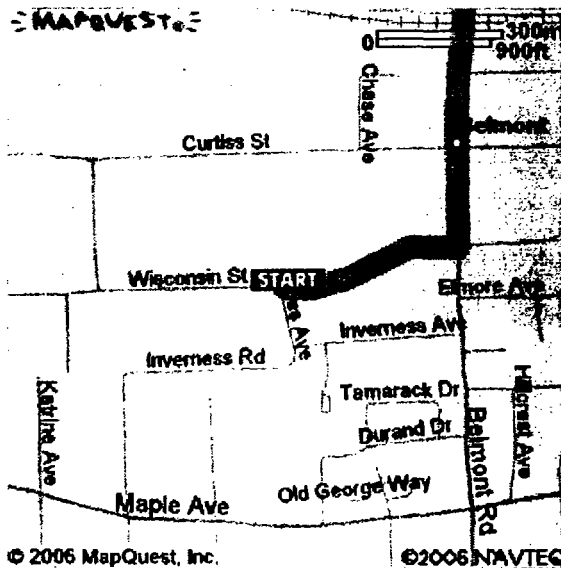


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**Start:**  
**2400 Wisconsin Ave**  
 Downers Grove, IL 60515-4019, US

**End:**  
**Advocate Good Samaritan Hosp:**  
 630-275-5900  
 3815 Highland Ave # 1002, Downers Grove, IL 60515, US



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# MAPQUEST

**Start:** 2655 Wisconsin Ave  
Downers Grove, IL 60515-4243,  
US

**End:** Advocate Good Samaritan  
Hosp: 630-275-5900  
3815 Highland Ave # 1002,  
Downers Grove, IL 60515, US






## Notes:



## Directions

## Distance

**Total Est. Time:** 10 minutes      **Total Est. Distance:** 3.89 miles

- |   |   |           |
|---|---|-----------|
|    | <b>1:</b> Start out going EAST on WISCONSIN ST toward KATRINE AVE.  | 0.5 miles |
|  | <b>2:</b> Turn LEFT onto BELMONT RD.  | 1.1 miles |
|  | <b>3:</b> Turn RIGHT onto OGDEN AVE / US-34.  | 1.4 miles |
|  | <b>4:</b> Turn LEFT onto MAIN ST / CR-9. Continue to follow CR-9.   | 0.7 miles |
|  | <b>5:</b> End at <b>Advocate Good Samaritan Hosp</b><br>3815 Highland Ave # 1002, Downers Grove, IL 60515, US |           |

**Total Est. Time:** 10 minutes      **Total Est. Distance:** 3.89 miles



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# MAPQUEST

**Start:** Katrine Ave & Curtiss St  
Downers Grove, IL 60515, US

**End:** Advocate Good Samaritan  
Hosp: 630-275-5900  
3815 Highland Ave # 1002,  
Downers Grove, IL 60515, US

## Notes:

hotels.com

HOTELS  
FOR LIFE  
SWEEPSTAKES

Enter to  
Win Hotels  
for Life

Play Now!

GO!





See website for details

## Directions

**Total Est. Time:** 9 minutes

**Total Est. Distance:** 3.72 miles

## Distance

- |   |   |            |
|---|---|------------|
| <b>START</b>  | <b>1:</b> Start out going NORTH on KATRINE AVE toward CURTISS ST.   | <0.1 miles |
|   | <b>2:</b> Turn RIGHT onto CURTISS ST.   | 0.5 miles  |
|  | <b>3:</b> Turn LEFT onto BELMONT RD.  | 0.9 miles  |
|  | <b>4:</b> Turn RIGHT onto OGDEN AVE / US-34.  | 1.4 miles  |
|  | <b>5:</b> Turn LEFT onto MAIN ST / CR-9. Continue to follow CR-9.   | 0.7 miles  |
| <b>ENC</b>  | <b>6:</b> End at <b>Advocate Good Samaritan Hosp</b><br>3815 Highland Ave # 1002, Downers Grove, IL 60515, US |            |

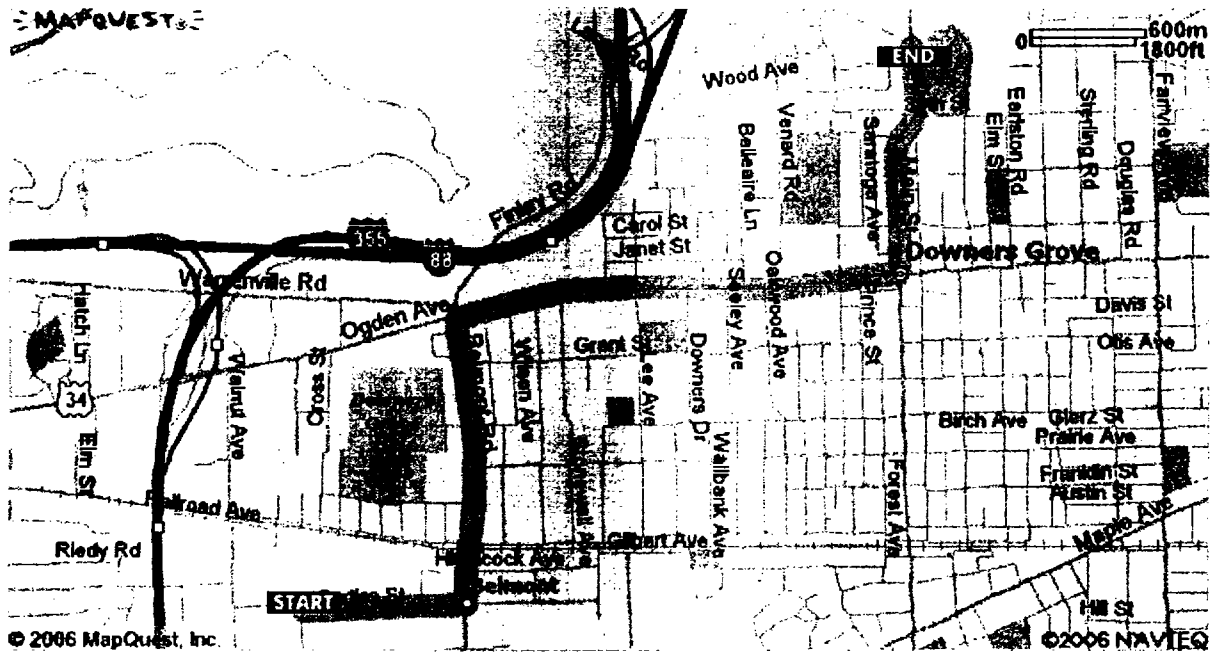
**Total Est. Time:** 9 minutes

**Total Est. Distance:** 3.72 miles



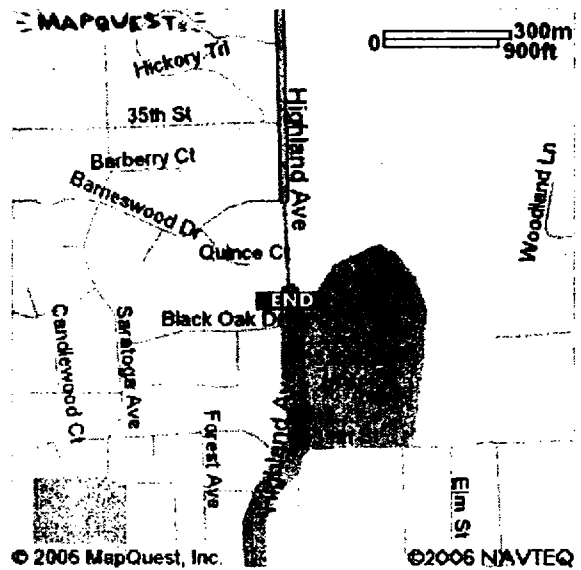
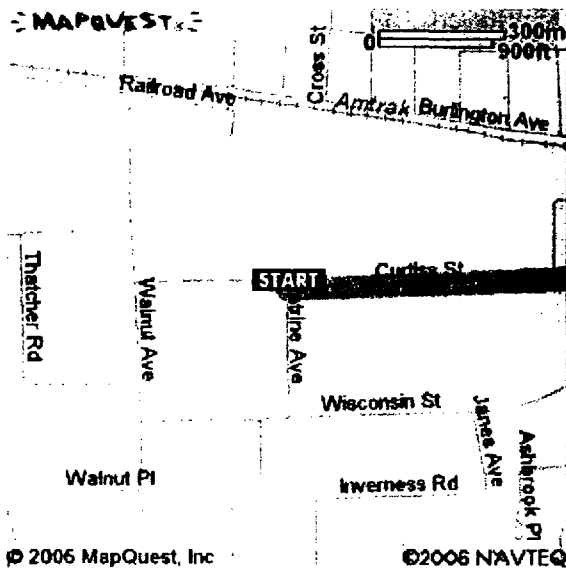
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**Start:**  
**Katrine Ave & Curtiss St**  
 Downers Grove, IL 60515, US

**End:**  
**Advocate Good Samaritan Hosp:**  
 630-275-5900  
 3815 Highland Ave # 1002, Downers  
 Grove, IL 60515, US



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# MAPQUEST

**Start:** Walnut Ave & Thatcher Rd  
Downers Grove, IL 60515, US

**End:** Advocate Good Samaritan  
Hosp: 630-275-5900  
3815 Highland Ave # 1002,  
Downers Grove, IL 60515, US

## Notes:

• THE AMOCO •  
**ROAD! TOUR**  
SWEEPSTAKES



**ENTER NOW**

YOU COULD WIN A TRIP FOR 4  
TO ONE OF 5 DESTINATIONS

## Directions

## Distance

**Total Est. Time:** 11 minutes

**Total Est. Distance:** 4.09 miles



**1:** Start out going NORTH on WALNUT AVE toward CURTISS ST.

0.1 miles



**2:** Turn RIGHT onto CURTISS ST.

0.7 miles



**3:** Turn LEFT onto BELMONT RD.

0.9 miles



**4:** Turn RIGHT onto OGDEN AVE / US-34.

1.4 miles



**5:** Turn LEFT onto MAIN ST / CR-9. Continue to follow CR-9.

0.7 miles



**6:** End at **Advocate Good Samaritan Hosp**

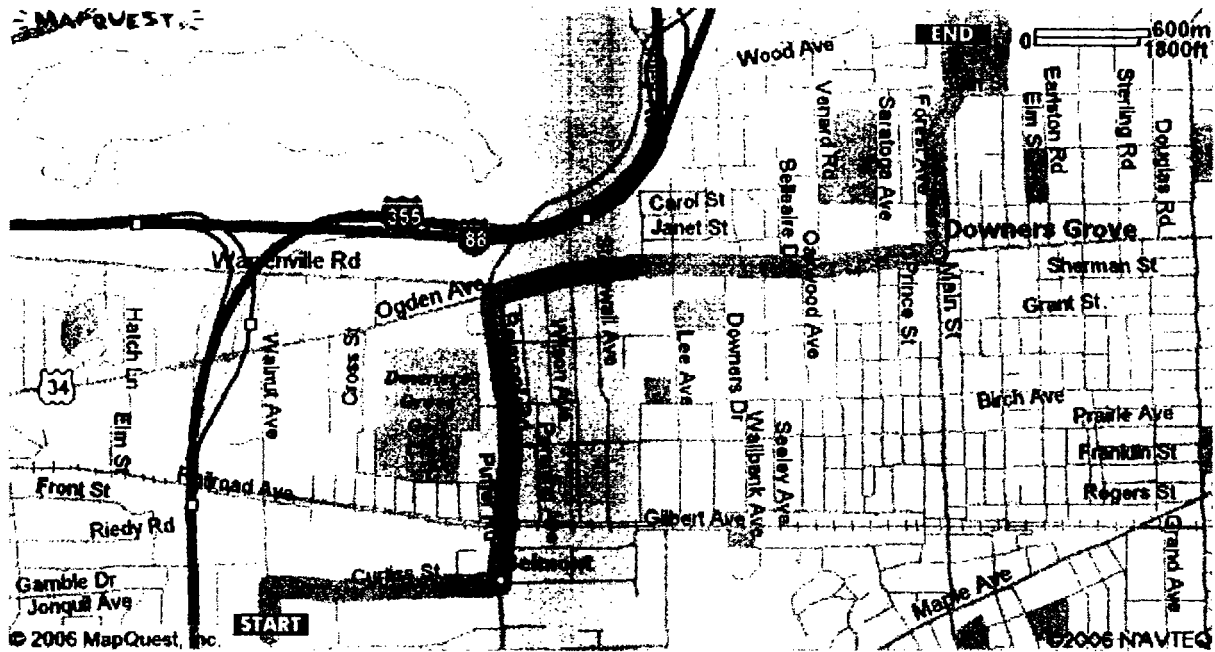
3815 Highland Ave # 1002, Downers Grove, IL 60515, US

**Total Est. Time:** 11 minutes

**Total Est. Distance:** 4.09 miles

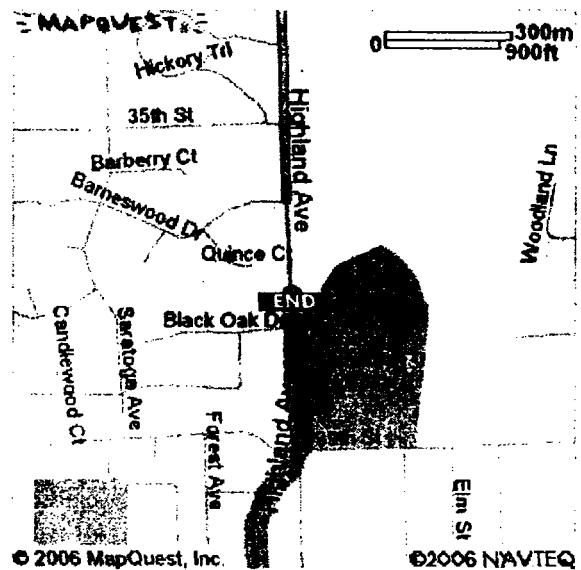


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**Start:**  
**Walnut Ave & Thatcher Rd**  
 Downers Grove, IL 60515, US

**End:**  
**Advocate Good Samaritan Hosp:**  
 630-275-5900  
 3815 Highland Ave # 1002, Downers  
 Grove, IL 60515, US



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**Start:** 2514 Wisconsin Ave  
Downers Grove, IL 60515-4230,  
US

**End:** Advocate Good Samaritan  
Hosp: 630-275-5900  
3815 Highland Ave # 1002,  
Downers Grove, IL 60515, US

**Notes:**



#### Directions

#### Distance

**Total Est. Time:** 9 minutes      **Total Est. Distance:** 3.73 miles

START

**1:** Start out going EAST on WISCONSIN ST toward JANES AVE. 0.3 miles



**2:** Turn LEFT onto BELMONT RD. 1.1 miles



**3:** Turn RIGHT onto OGDEN AVE / US-34. 1.4 miles



**4:** Turn LEFT onto MAIN ST / CR-9. Continue to follow CR-9. 0.7 miles

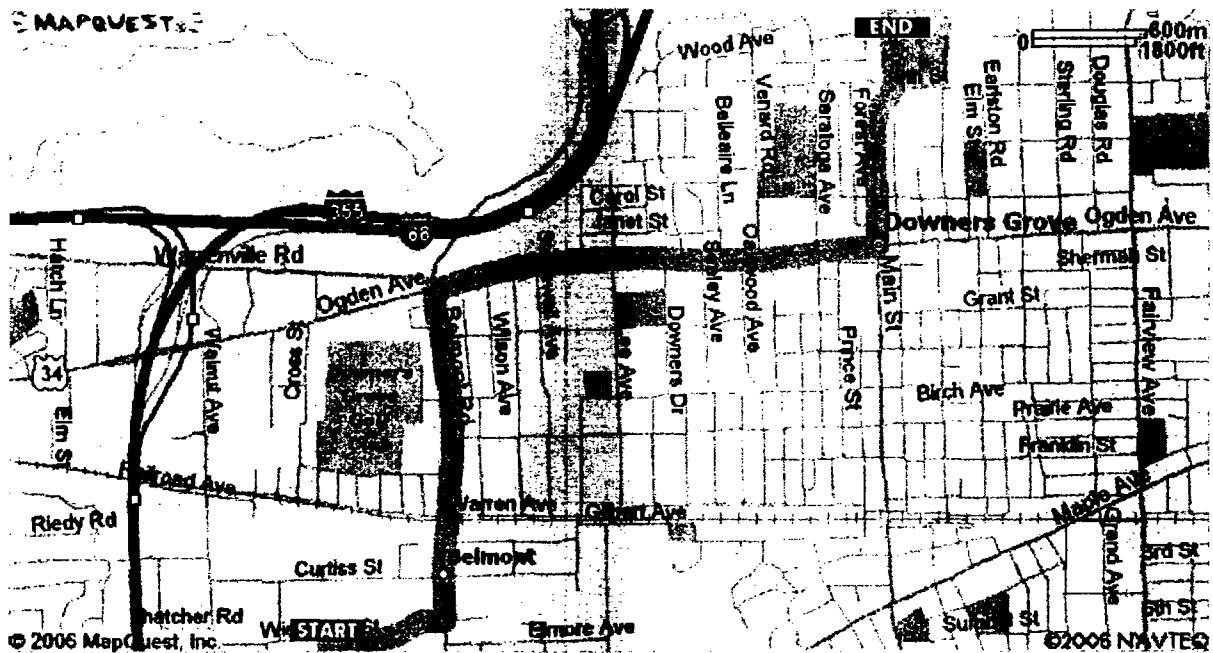
END

**5:** End at **Advocate Good Samaritan Hosp**  
3815 Highland Ave # 1002, Downers Grove, IL 60515, US

**Total Est. Time:** 9 minutes      **Total Est. Distance:** 3.73 miles

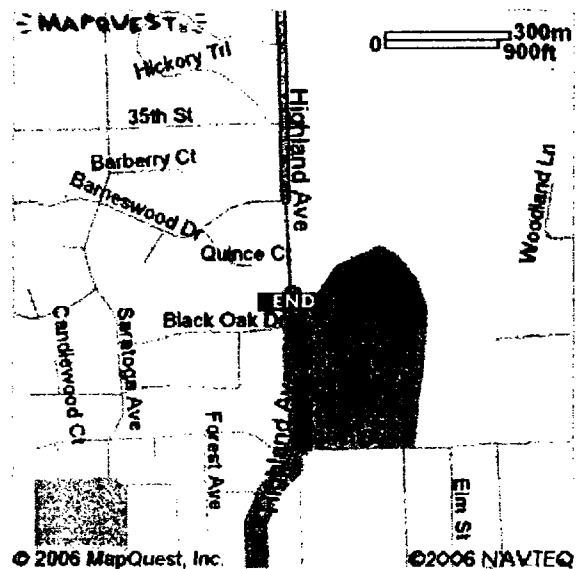
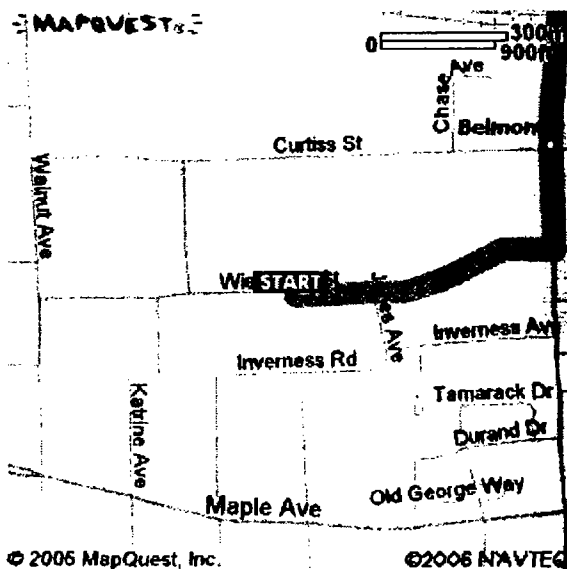


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**Start:**  
**2514 Wisconsin Ave**  
 Downers Grove, IL 60515-4230, US

**End:**  
**Advocate Good Samaritan Hosp:**  
 630-275-5900  
 3815 Highland Ave # 1002, Downers  
 Grove, IL 60515, US



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**Start:** 2820 Hitchcock Ave  
Downers Grove, IL 60515-4041,  
US

**End:** Advocate Good Samaritan  
Hosp: 630-275-5900  
3815 Highland Ave # 1002,  
Downers Grove, IL 60515, US

**Notes:**

Travel while it's hot.  
Save at least 20% on summer flights.

SEARCH FLIGHTS

AOL travel

**Directions**

**Distance**

**Total Est. Time:** 11 minutes

**Total Est. Distance:** 4.05 miles

START

**1:** Start out going EAST on HITCHCOCK AVE toward WALNUT AVE.

<0.1 miles



**2:** Turn RIGHT onto WALNUT AVE.

<0.1 miles



**3:** Turn LEFT onto CURTISS ST.

0.7 miles



**4:** Turn LEFT onto BELMONT RD.

0.9 miles



**5:** Turn RIGHT onto OGDEN AVE / US-34.

1.4 miles



**6:** Turn LEFT onto MAIN ST / CR-9. Continue to follow CR-9.

0.7 miles

END

**7:** End at Advocate Good Samaritan Hosp

3815 Highland Ave # 1002, Downers Grove, IL 60515, US

**Total Est. Time:** 11 minutes

**Total Est. Distance:** 4.05 miles



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# MAPQUEST

**Start:** 5300 Belmont Rd  
Downers Grove, IL 60515-4400,  
US

**End:** Advocate Good Samaritan  
Hosp: 630-275-5900  
3815 Highland Ave # 1002,  
Downers Grove, IL 60515, US

## Notes:



## Directions

## Distance

**Total Est. Time:** 8 minutes

**Total Est. Distance:** 3.34 miles

START

**1:** Start out going NORTH on BELMONT RD toward CURTISS ST.

1.1 miles



**2:** Turn RIGHT onto OGDEN AVE / US-34.

1.4 miles



**3:** Turn LEFT onto MAIN ST / CR-9. Continue to follow CR-9.

0.7 miles

END

**4:** End at Advocate Good Samaritan Hosp

3815 Highland Ave # 1002, Downers Grove, IL 60515, US

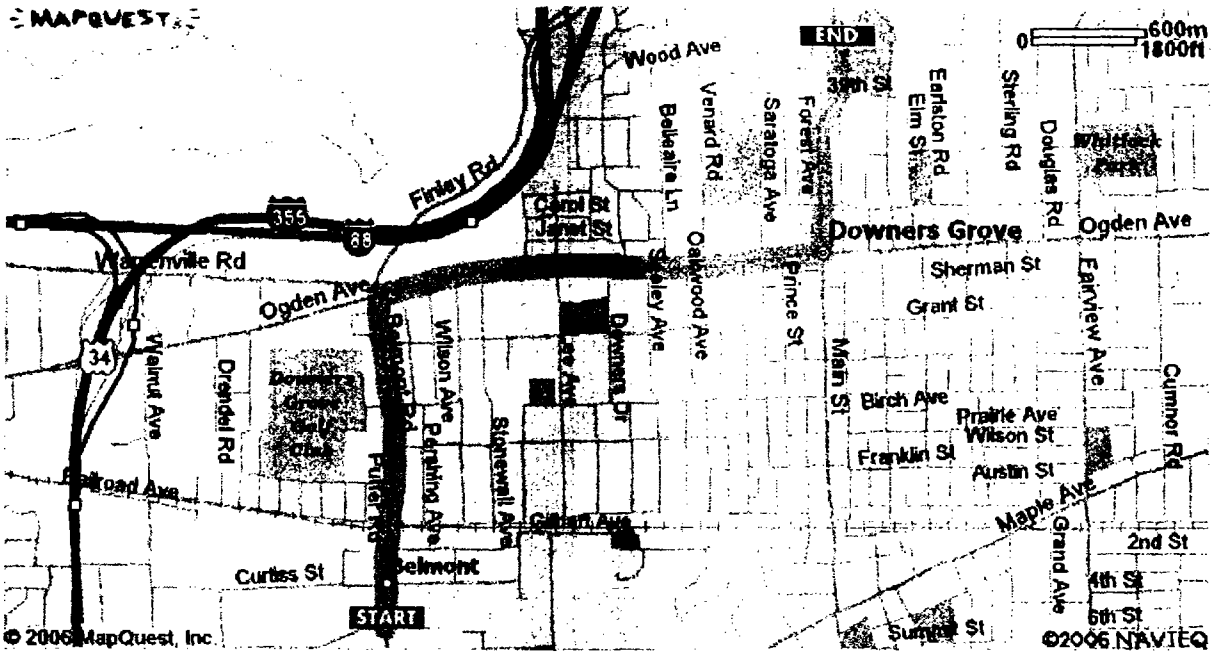
**Total Est. Time:** 8 minutes

**Total Est. Distance:** 3.34 miles



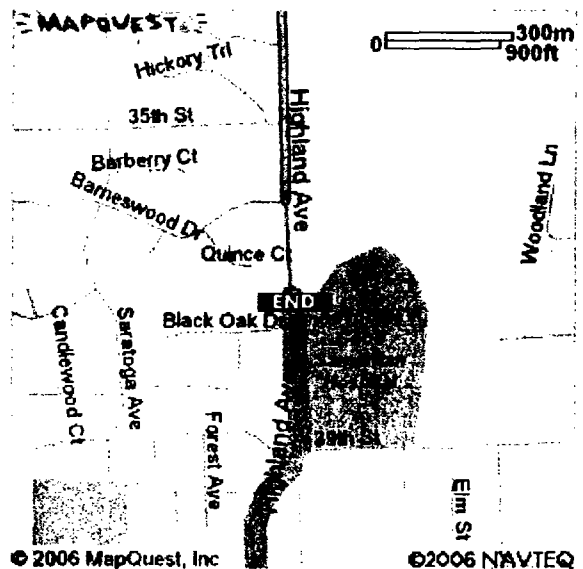
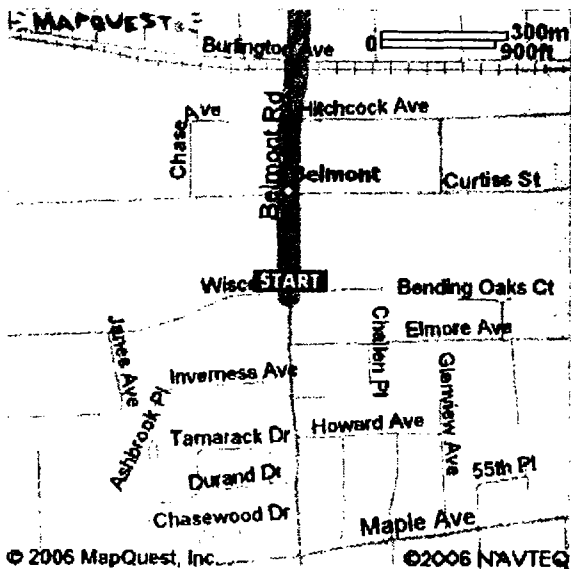
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**Start:**  
**5300 Belmont Rd**  
 Downers Grove, IL 60515-4400, US

**End:**  
**Advocate Good Samaritan Hosp:**  
 630-275-5900  
 3815 Highland Ave # 1002, Downers  
 Grove, IL 60515, US



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## 5.1 CONTINGENCIES

### 5.1.3 Response Plans

<b>Medical - General</b>  Provide first aid, if trained; assess and determine need for further medical assistance.  Transport or arrange for transport after appropriate decontamination.  In the case of a life-threatening emergency, no decontamination will be done to personnel before transportation to a medical facility.		First Aid Kit: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No  Blood Borne Pathogens Kit: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<b>Type</b>  Standard 20-man and infection control kit	<b>Location</b>  In Vehicle	Special First-Aid Procedures: Cyanides on-site <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No  If yes, contact LMF. Do they have antidote kit? <input type="checkbox"/> Yes <input type="checkbox"/> No
		Eyewash required <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<b>Type</b>  Eyewash Bottle	<b>Location</b>  Field Office/Trailer	HF on-site <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No  If yes, need neutralizing ointment for first-aid kit. Contact LMF.
		Shower required <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<b>Type</b>	<b>Location</b>	
<b>Plan for Response to Spill/Release</b>  In the event of a spill or release, ensure safety, assess situation, and perform containment and control measures, as appropriate.		<b>Plan for Response to Fire/Explosion</b>  In the event of a fire or explosion, ensure personal safety, assess situation, and perform containment and control measures, as appropriate:			<b>Fire Extinguishers</b>  Type/Location <u>ABC/Field Trailer</u> <u>ABC/Each piece of heavy machinery</u> _____ / _____ _____ / _____ _____ / _____ _____ / _____
Description of Spill Response Gear N/A	Location	Description (Other Fire Response Equipment)			Location
Plan to Respond to Security Problems Buddy System-work in groups					
Avoid Confrontation					
Contact Police (if necessary)					

## **6. DECONTAMINATION PLAN**



## 6.1. GENERAL DECONTAMINATION PLAN

### Personnel Decontamination

Consistent with the levels of protection required, step-by-step procedures for personnel decontamination for each level of protection are attached.

### Levels of Protection Required for Decontamination Personnel

The levels of protection required for personnel assisting with decontamination will be:

☐

Level B

☐

Level C

☒

Level D

Modifications include:

Level C PPE when applicable (see RPP)

### Disposition of Decontamination Wastes

Provide a description of waste disposition including identification of storage area, hauler, and final disposal site, if applicable

If contamination is not detected, the material will be considered non-hazards and discarded as such. If the material is determined to be hazardous waste the material will be labeled as such & disposed of according to federal regulations utilizing a licensed hazardous waste disposal facility and waste hauler

ALL Tasks: Used PPE will be drummed. Drums will be covered when not in use. Full drums will be staged in a designated area until disposal at end of project. All liquid decon waters will be containerized.

ALL Tasks: All wastes will be drummed and/or bagged.

TBD-waste haulers and final disposal sites.

### Equipment Decontamination

A procedure for decontamination steps required for non-sampling equipment and heavy machinery follows:

All non-disposable drilling (e.g. rods) equipment that comes into contact with site soils, sediments, and surface water will either be steam cleaned or gross decontaminated with distilled-water and brush, washed with Alconox solution and rinsed with distilled water. Rinse water will be collected in a sump area constructed within the decontamination pad. The sump area will be pumped into 55-gallon drums, then sampled and removed from site according to federal regulations.

ALL Tasks: All tools and equipment will be deconned using an Alconox wash followed by a water rinse.

### Sampling Equipment Decontamination

Sampling equipment will be decontaminated in accordance with the following procedure:

All non-disposable sampling equipment that comes into contact with site soils, sediments, and surface water will either be steam cleaned or gross decontaminated with distilled-water and brush, washed with Alconox solution and rinsed with distilled water. The solution will be collected in 5-gallon buckets with detachable lids. The buckets will be emptied into 55-gallon drums located at the decontamination pad and storage area. The drums will be sampled and removed from site according to federal regulations.

For each specific task, the decon procedure will be the same as for non-sampling equipment described above.

## 6.2 LEVEL D DECONTAMINATION PLAN

Check indicated functions or add steps, as necessary:

Function	Description of Process, Solution, and Container
----------	---

<input type="checkbox"/> Segregated equipment drop	
--	--

<input type="checkbox"/> Boot cover and glove wash	
--	--

<input type="checkbox"/> Boot cover and glove rinse	
---	--

<input type="checkbox"/> Tape removal - outer glove and boot	
--	--

<input checked="" type="checkbox"/> Boot cover removal	Remove and dispose in designated bag.
--	---------------------------------------

<input checked="" type="checkbox"/> Outer glove removal	Remove and dispose in designated bag.
---	---------------------------------------

### HOTLINE

<input type="checkbox"/> Suit/safety boot wash	
--	--

<input type="checkbox"/> Suit/boot/glove rinse	
--	--

<input type="checkbox"/> Safety boot removal	
--	--

<input type="checkbox"/> Suit removal	
---------------------------------------	--

<input type="checkbox"/> Inner glove wash	
---	--

<input type="checkbox"/> Inner glove rinse	
--	--

<input type="checkbox"/> Inner glove removal	
--	--

<input type="checkbox"/> Inner clothing removal	
---	--

### CONTAMINATION REDUCTION ZONE (CRZ)/SAFE ZONE BOUNDARY

<input type="checkbox"/> Field wash	
-------------------------------------	--

<input type="checkbox"/> Redress	
----------------------------------	--

Disposal Plan, End of Day:

Refer to Section 6.1

Disposal Plan, End of Week:

TBD

Disposal Plan, End of Project:

TBD

### 6.3 LEVEL 1 CONTAMINATION PLAN

Check indicated functions or add steps, as necessary:

**Function**

**Description of Process, Solution, and Container**

☐ Segregated equipment drop

☐ Boot cover and glove wash

☐ Boot cover and glove rinse

☐ Tape removal - outer glove and boot

☐ Boot cover removal

☐ Outer glove removal

#### OUTLINE

☐ Suit/safety boot wash

☐ Suit/boot/glove rinse

☐ Safety boot removal

☐ Suit removal

☐ Inner glove wash

☐ Inner glove rinse

☐ Facepiece removal

☐ Inner glove removal

☐ Inner clothing removal

#### CONTAMINATION REDRESS ZONE (CRZ)/SAFE ZONE BOUNDARY

☐ Field wash

☐ Redress

**Disposal Plan, End of Day:**

**Disposal Plan, End of Week:**

**Disposal Plan, End of Project:**

## 6.4 - LEVEL B DECONTAMINATION PLAN

Check indicated functions or add steps, as necessary:

Function	Description of Process, Solution, and Container
<input type="checkbox"/> Segregated equipment drop	
<input type="checkbox"/> Boot cover and glove wash	
<input type="checkbox"/> Boot cover and glove rinse	
<input type="checkbox"/> Tape removal - outer glove and boot	
<input type="checkbox"/> Boot cover removal	
<input type="checkbox"/> Outer glove removal	
<b>HOTLINE</b>	
<input type="checkbox"/> Suit/safety boot wash	
<input type="checkbox"/> Suit/SCBA/boot/glove rinse	
<input type="checkbox"/> Safety boot removal	
<input type="checkbox"/> Remove SCBA backpack without disconnecting	
<input type="checkbox"/> Splash suit removal	
<input type="checkbox"/> Inner glove wash	
<input type="checkbox"/> Inner glove rinse	
<input type="checkbox"/> SCBA disconnect and facepiece removal	
<input type="checkbox"/> Inner glove removal	
<input type="checkbox"/> Inner clothing removal	
<b>CONTAMINATION REDUCTION ZONE (CRZ)/SAFE ZONE BOUNDARY</b>	
<input type="checkbox"/> Field wash	
<input type="checkbox"/> Redress	
<b>Disposal Plan, End of Day:</b>	
<b>Disposal Plan, End of Week:</b>	
<b>Disposal Plan, End of Project:</b>	



**7. TRAINING AND BRIEFING TOPICS/SIGN OFF SHEET**

7-1. TRAINING AND BRIEFING TOPICS	
The following items will be covered at the site-specific training meeting, daily or periodically.	
<input checked="" type="checkbox"/> Site characterization and analysis, Sec. 3.0, 29 CFR 1910.120 (l)	<input type="checkbox"/> Level A
<input checked="" type="checkbox"/> Physical hazards, HASP Form 07	<input type="checkbox"/> Level B
<input checked="" type="checkbox"/> Chemical hazards, HASP Form 04	<input type="checkbox"/> Level C
<input checked="" type="checkbox"/> Animal bites, stings, and poisonous plants	<input checked="" type="checkbox"/> Level D
<input type="checkbox"/> Etiologic (infectious) agents	<input checked="" type="checkbox"/> Monitoring, 29 CFR 1910.120 (h)
<input checked="" type="checkbox"/> Site control, 29 CFR 1910.120 (d)	<input checked="" type="checkbox"/> Decontamination, 29 CFR 1910.120 (k)
<input checked="" type="checkbox"/> Engineering controls and work practices, 29 CFR 1910.120 (g)	<input checked="" type="checkbox"/> Emergency response, 29 CFR 1910.120 (l)
<input checked="" type="checkbox"/> Heavy machinery	<input checked="" type="checkbox"/> Elements of an emergency response, 29 CFR 1910.120 (l)
<input type="checkbox"/> Forklift	<input checked="" type="checkbox"/> Procedures for handling site emergency incidents, 29 CFR 1910.120 (l)
<input checked="" type="checkbox"/> Backhoe	<input type="checkbox"/> Off-site emergency response, 29 CFR 1910.120 (l)
<input checked="" type="checkbox"/> Equipment	<input type="checkbox"/> Handling drums and containers, 29 CFR 1910.120 (j)
<input checked="" type="checkbox"/> Tools	<input checked="" type="checkbox"/> Opening drums and containers
<input type="checkbox"/> Ladder, 29 CFR 1910.27 (d)/29 CFR 1926	<input type="checkbox"/> Electrical material handling equipment
<input checked="" type="checkbox"/> Overhead and underground utilities	<input type="checkbox"/> Radioactive waste
<input type="checkbox"/> Scaffolds	<input type="checkbox"/> Shock-sensitive waste
<input type="checkbox"/> Structural integrity	<input type="checkbox"/> Laboratory waste packs
<input checked="" type="checkbox"/> Unguarded openings - wall, floor, ceilings	<input type="checkbox"/> Sampling drums and containers
<input type="checkbox"/> Pressurized air cylinders	<input checked="" type="checkbox"/> Shipping and transport, 49 CFR 172.101, IATA
<input checked="" type="checkbox"/> Personal protective equipment, 29 CFR 1910.120 (g); 29 CFR 1910.134	<input type="checkbox"/> Tank and vault procedures
<input type="checkbox"/> Respiratory protection, 29 CFR 1910.120 (g); ANSI Z88.2	<input checked="" type="checkbox"/> Illumination, 29 CFR 1910.120 (m)
<input type="checkbox"/> Working over water FLD-19	<input checked="" type="checkbox"/> Sanitation, 29 CFR 1910.120 (n)
<input type="checkbox"/> Boating safety FLD-18	<input type="checkbox"/>
<input type="checkbox"/> Site Specific Radiation Training	<input type="checkbox"/>

7-2 HEALTH AND SAFETY PLAN APPROVAL/SIGNOFF FORM	
Site Name: Ellsworth Industrial Park Site	WO#: 20064.251.100.0132
Address: OU1 Ellsworth Industrial Park Site-Study Areas A through K; 2500 Curtiss Street; Curtiss and Glenview Intersection; Shopping Mall Parking Lot 63 <sup>rd</sup> Street between Belmont and Woodward; I-355 and 63 <sup>rd</sup> Street Intersection; Hanson Road between Lee Street and Springside Avenue; Pershing Road between 59 <sup>th</sup> Street and Maple Avenue; Downers Grove, Illinois	
I understand, agree to, and will conform with the information set forth in this Health and Safety Plan (and attachments) and discussed in the personnel health and safety briefing(s).	

**WO#: 20064.251.100.0132**

I understand, agree to, and will conform with the information set forth in this Health and Safety Plan (and attachments) and discussed in the personnel health and safety briefing(s).

Date \_\_\_\_\_

[illegible]

**ATTACHMENT A**  
**CHEMICAL CONTAMINANTS DATA SHEETS**

***(Attach NIOSH)***

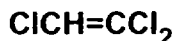


# NIOSH Pocket Guide to Chemical Hazards

NPG Home | Introduction | Synonyms & Trade Names | Chemical Names | CAS Numbers | RTECS Numbers | Appendices | Search

## Trichloroethylene

CAS 79-01-6



RTECS KX4550000

### Synonyms & Trade Names

Ethylene trichloride, TCE, Trichloroethene, Trilene

### DOT ID & Guide

1710 160

### Exposure Limits

NIOSH REL: Ca See Appendix A See Appendix C

OSHA PEL†: TWA 100 ppm C 200 ppm 300 ppm (5-minute maximum peak in any 2 hours)

IDLH Ca [1000 ppm] See: 79016

Conversion 1 ppm = 5.37 mg/m<sup>3</sup>

### Physical Description

Colorless liquid (unless dyed blue) with a chloroform-like odor.

MW: 131.4

BP: 189°F

FRZ: -99°F

Sol(77°F): 0.1%

VP: 58 mmHg

IP: 9.45 eV

Sp.Gr: 1.46

F.L.P.: ?

UEL(77°F): 10.5%

LEL(77°F): 8%

Combustible Liquid, but burns with difficulty.

### Incompatibilities & Reactivities

Strong caustics & alkalis; chemically-active metals (such as barium, lithium, sodium, magnesium, titanium & beryllium)

### Measurement Methods

NIOSH 1022, 3800; OSHA 1001

See: NMAM or OSHA Methods

### Personal Protection & Sanitation (See protection)

Skin: Prevent skin contact

Eyes: Prevent eye contact

Wash skin: When contaminated

Remove: When wet or contaminated

Change: No recommendation

Provide: Eyewash, Quick drench

### First Aid (See procedures)

Eye: Irrigate immediately

Skin: Soap wash promptly

Breathing: Respiratory support

Swallow: Medical attention immediately

### Respirator Recommendations NIOSH

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration:

(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

#### Escape:

(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Important additional information about respirator selection

### Exposure Routes

inhalation, skin absorption, ingestion, skin and/or eye contact

### Symptoms

Irritation eyes, skin; headache, visual disturbance, lassitude (weakness, exhaustion), dizziness, tremor, drowsiness, nausea, vomiting; dermatitis; cardiac arrhythmias, paresthesia; liver injury; [potential occupational carcinogen]

### Target Organs

Eyes, skin, respiratory system, heart, liver, kidneys, central nervous system

### Cancer Site

[in animals: liver & kidney cancer]

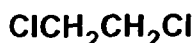
See also: INTRODUCTION See ICSC CARD: 0081 See MEDICAL TESTS: 0236

# NIOSH Pocket Guide to Chemical Hazards

NPG Home | Introduction | Synonyms & Trade Names | Chemical Names | CAS Numbers | RTECS Numbers | Appendices | Search

## Ethylene dichloride

CAS 107-06-2



RTECS KI0525000

### Synonyms & Trade Names

1,2-Dichloroethane; Ethylene chloride; Glycol dichloride

### DOT ID & Guide

1184 131

### Exposure Limits

**NIOSH REL:** Ca TWA 1 ppm (4 mg/m<sup>3</sup>) ST 2 ppm (8 mg/m<sup>3</sup>) See Appendix A See Appendix C (Chloroethanes)

**OSHA PEL†:** TWA 50 ppm C 100 ppm 200 ppm [5-minute maximum peak in any 3 hours]

**IDLH** Ca [50 ppm] See: 107062

**Conversion** 1 ppm = 4.05 mg/m<sup>3</sup>

### Physical Description

Colorless liquid with a pleasant, chloroform-like odor. [Note: Decomposes slowly, becomes acidic & darkens in color.]

MW: 99.0

BP: 182°F

FRZ: -32°F

Sol: 0.9%

VP: 64 mmHg

IP: 11.05 eV

Sp.Gr: 1.24

F.L.P: 56°F

UEL: 16%

LEL: 6.2%

Class IB Flammable Liquid: F.L.P. below 73°F and BP at or above 100°F.

### Incompatibilities & Reactivities

Strong oxidizers & caustics; chemically-active metals such as magnesium or aluminum powder, sodium & potassium; liquid ammonia [Note: Decomposes to vinyl chloride & HCl above 1112°F.]

### Measurement Methods

NIOSH 1003; OSHA 3

See: NMAM or OSHA Methods

### Personal Protection & Sanitation (See protection)

Skin: Prevent skin contact

Eyes: Prevent eye contact

Wash skin: When contaminated

Remove: When wet (flammable)

Change: No recommendation

Provide: Eyewash, Quick drench

### First Aid (See procedures)

Eye: Irrigate immediately

Skin: Soap wash promptly

Breathing: Respiratory support

Swallow: Medical attention immediately

### Respirator Recommendations NIOSH

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration:

(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

#### Escape:

(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Important additional information about respirator selection

### Exposure Routes inhalation, ingestion, skin absorption, skin and/or eye contact

**Symptoms** Irritation eyes, corneal opacity; central nervous system depression; nausea, vomiting; dermatitis; liver, kidney, cardiovascular system damage; [potential occupational carcinogen]

**Target Organs** Eyes, skin, kidneys, liver, central nervous system, cardiovascular system

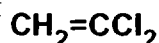
**Cancer Site** [in animals: forestomach, mammary gland & circulatory system cancer]

# NIOSH Pocket Guide to Chemical Hazards

NPG Home | Introduction | Synonyms & Trade Names | Chemical Names | CAS Numbers | RTECS Numbers | Appendices | Search

## Vinylidene chloride

CAS 75-35-4



RTECS KV9275000

### Synonyms & Trade Names

1,1-DCE; 1,1-Dichloroethene; 1,1-Dichloroethylene; VDC; Vinylidene chloride monomer; Vinylidene dichloride

### DOT ID & Guide

1303 130P (inhibited)

### Exposure Limits

NIOSH REL: Ca See Appendix A

OSHA PEL†: none

IDLH Ca [N.D.] See: IDLH INDEX

### Conversion

### Physical Description

Colorless liquid or gas (above 89°F) with a mild, sweet, chloroform-like odor.

MW: 96.9

BP: 89°F

FRZ: -189°F

Sol: 0.04%

VP: 500 mmHg

IP: 10.00 eV

Sp.Gr: 1.21

F.L.P.: -2°F

UEL: 15.5%

LEL: 6.5%

Class IA Flammable Liquid: F.L.P. below 73°F and BP below 100°F.

### Incompatibilities & Reactivities

Aluminum, sunlight, air, copper, heat [Note: Polymerization may occur if exposed to oxidizers, chlorosulfonic acid, nitric acid, or oleum. Inhibitors such as the monomethyl ether of hydroquinone are added to prevent polymerization.]

### Measurement Methods

NIOSH 1015; OSHA 19

See: NMAM or OSHA Methods

### Personal Protection & Sanitation (See protection)

Skin: Prevent skin contact  
Eyes: Prevent eye contact  
Wash skin: When contaminated  
Remove: When wet (flammable)  
Change: No recommendation  
Provide: Eyewash, Quick drench

### First Aid (See procedures)

Eye: Irrigate immediately  
Skin: Soap flush immediately  
Breathing: Respiratory support  
Swallow: Medical attention immediately

### Respirator Recommendations NIOSH

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration:

(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

#### Escape:

(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Important additional information about respirator selection

### Exposure Routes

inhalation, skin absorption, ingestion, skin and/or eye contact

**Symptoms** Irritation eyes, skin, throat; dizziness, headache, nausea, dyspnea (breathing difficulty); liver, kidney disturbance; pneumonitis; [potential occupational carcinogen]

**Target Organs** Eyes, skin, respiratory system, central nervous system, liver, kidneys

**Cancer Site** [in animals: liver & kidney tumors]



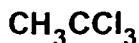


# NIOSH Pocket Guide to Chemical Hazards

[NPG Home](#) | [Introduction](#) | [Synonyms & Trade Names](#) | [Chemical Names](#) | [CAS Numbers](#) | [RTECS Numbers](#) | [Appendices](#) | [Search](#)

## Methyl chloroform

CAS 71-55-6



RTECS KJ2975000

### Synonyms & Trade Names

Chlorothene; 1,1,1-Trichloroethane; 1,1,1-Trichloroethane (stabilized)

### DOT ID & Guide

2831 160

### Exposure Limits

NIOSH REL: C 350 ppm (1900 mg/m<sup>3</sup>) [15-minute] See Appendix C (Chloroethanes)OSHA PEL†: TWA 350 ppm (1900 mg/m<sup>3</sup>)

IDLH 700 ppm See: 71556

Conversion 1 ppm = 5.46 mg/m<sup>3</sup>

### Physical Description

Colorless liquid with a mild, chloroform-like odor.

MW: 133.4

BP: 165°F

FRZ: -23°F

Sol: 0.4%

VP: 100 mmHg

IP: 11.00 eV

Sp.Gr: 1.34

F.L.P.: ?

UEL: 12.5%

LEL: 7.5%

Combustible Liquid, but burns with difficulty.

### Incompatibilities & Reactivities

Strong caustics; strong oxidizers; chemically-active metals such as zinc, aluminum, magnesium powders, sodium & potassium; water  
[Note: Reacts slowly with water to form hydrochloric acid.]

### Measurement Methods

NIOSH 1003

See: NMAM or OSHA Methods

### Personal Protection & Sanitation (See protection)

Skin: Prevent skin contact

Eyes: Prevent eye contact

Wash skin: When contaminated

Remove: When wet or contaminated

Change: No recommendation

### First Aid (See procedures)

Eye: Irrigate immediately

Skin: Soap wash promptly

Breathing: Respiratory support

Swallow: Medical attention immediately

### Respirator Recommendations NIOSH/OSHA

Up to 700 ppm:

(APF = 10) Any supplied-air respirator\*

(APF = 50) Any self-contained breathing apparatus with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions:

(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape:

(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Important additional information about respirator selection

### Exposure Routes inhalation, ingestion, skin and/or eye contact

**Symptoms** Irritation eyes, skin; headache, lassitude (weakness, exhaustion), central nervous system depression, poor equilibrium; dermatitis; cardiac arrhythmias; liver damage**Target Organs** Eyes, skin, central nervous system, cardiovascular system, liver

# NIOSH Pocket Guide to Chemical Hazards

NPG Home | Introduction | Synonyms & Trade Names | Chemical Names | CAS Numbers | RTECS Numbers | Appendices | Search

## Carbon tetrachloride

CAS 56-23-5

CCl<sub>4</sub>

RTECS FG4900000

### Synonyms & Trade Names

Carbon chloride; Carbon tet; Freon® 10; Halon® 104; Tetrachloromethane

### DOT ID & Guide

1846 151

### Exposure Limits

NIOSH REL: Ca ST 2 ppm (12.6 mg/m<sup>3</sup>) [60-minute] See Appendix A

OSHA PEL†: TWA 10 ppm C 25 ppm 200 ppm (5-minute maximum peak in any 4 hours)

IDLH Ca [200 ppm] See: 56235

Conversion 1 ppm = 6.29 mg/m<sup>3</sup>

### Physical Description

Colorless liquid with a characteristic ether-like odor.

MW: 153.8

BP: 170°F

FRZ: -9°F

Sol: 0.05%

VP: 91 mmHg

IP: 11.47 eV

Sp.Gr: 1.59

F.L.P: NA

UEL: NA

LEL: NA

Noncombustible Liquid

### Incompatibilities & Reactivities

Chemically-active metals such as sodium, potassium & magnesium; fluorine; aluminum [Note: Forms highly toxic phosgene gas when exposed to flames or welding arcs.]

### Measurement Methods

NIOSH 1003; OSHA 7

See: NMAM or OSHA Methods

### Personal Protection & Sanitation (See protection)

Skin: Prevent skin contact

Eyes: Prevent eye contact

Wash skin: When contaminated

Remove: When wet or contaminated

Change: No recommendation

Provide: Eyewash, Quick drench

### First Aid (See procedures)

Eye: Irrigate immediately

Skin: Soap wash immediately

Breathing: Respiratory support

Swallow: Medical attention immediately

### Respirator Recommendations NIOSH

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration:

(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

#### Escape:

(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Important additional information about respirator selection

### Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

**Symptoms** Irritation eyes, skin; central nervous system depression; nausea, vomiting; liver, kidney injury; drowsiness, dizziness, incoordination; [potential occupational carcinogen]

**Target Organs** central nervous system, eyes, lungs, liver, kidneys, skin

**Cancer Site** [in animals: liver cancer]

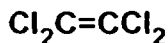


# NIOSH Pocket Guide to Chemical Hazards

NPG Home | Introduction | Synonyms &amp; Trade Names | Chemical Names | CAS Numbers | RTECS Numbers | Appendices | Search

## Tetrachloroethylene

CAS 127-18-4



RTECS KX3850000

### Synonyms & Trade Names

Perchloroethylene, Perchloroethylene, Perk, Tetrachlorethylene

### DOT ID & Guide

1897 160

### Exposure Limits

NIOSH REL: Ca Minimize workplace exposure concentrations. See Appendix A

OSHA PEL†: TWA 100 ppm C 200 ppm 300 ppm (5-minute maximum peak in any 3-hours)

IDLH Ca [150 ppm] See: 127184

Conversion 1 ppm = 6.78 mg/m<sup>3</sup>

### Physical Description

Colorless liquid with a mild, chloroform-like odor.

MW: 165.8

BP: 250°F

FRZ: -2°F

Sol: 0.02%

VP: 14 mmHg

IP: 9.32 eV

Sp.Gr: 1.62

F.L.P: NA

UEL: NA

LEL: NA

Noncombustible Liquid, but decomposes in a fire to hydrogen chloride and phosgene.

### Incompatibilities & Reactivities

Strong oxidizers; chemically-active metals such as lithium, beryllium &amp; barium; caustic soda; sodium hydroxide; potash

### Measurement Methods

NIOSH 1003; OSHA 1001

See: NMAM or OSHA Methods

### Personal Protection & Sanitation (See protection)

Skin: Prevent skin contact

Eyes: Prevent eye contact

Wash skin: When contaminated

Remove: When wet or contaminated

Change: No recommendation

Provide: Eyewash, Quick drench

### First Aid (See procedures)

Eye: Irrigate immediately

Skin: Soap wash promptly

Breathing: Respiratory support

Swallow: Medical attention immediately

### Respirator Recommendations NIOSH

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration:

(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

#### Escape:

(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Important additional information about respirator selection

### Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

**Symptoms** Irritation eyes, skin, nose, throat, respiratory system; nausea; flush face, neck; dizziness, incoordination; headache, drowsiness; skin erythema (skin redness); liver damage; [potential occupational carcinogen]**Target Organs** Eyes, skin, respiratory system, liver, kidneys, central nervous system**Cancer Site** [in animals: liver tumors]

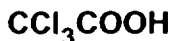
See also: INTRODUCTION See ICSC CARD: 0076 See MEDICAL TESTS: 0179

# NIOSH Pocket Guide to Chemical Hazards

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## Trichloroacetic acid

CAS 76-03-9



RTECS AJ7875000

### Synonyms & Trade Names

TCA, Trichloroethanoic acid

### DOT ID & Guide

1839 153 (solid)

2564 153 (solution)

### Exposure Limits

NIOSH REL: TWA 1 ppm (7 mg/m<sup>3</sup>)

OSHA PEL†: none

IDLH N.D. See: IDLH INDEX

Conversion 1 ppm = 6.68 mg/m<sup>3</sup>

### Physical Description

Colorless to white, crystalline solid with a sharp, pungent odor.

MW: 163.4

BP: 388°F

MLT: 136°F

Sol: Miscible

VP(124°F): 1 mmHg

IP: ?

Sp.Gr: 1.62

F.L.P: NA

UEL: NA

LEL: NA

Noncombustible Solid

### Incompatibilities & Reactivities

Moisture, iron, zinc, aluminum, strong oxidizers [Note: Decomposes on heating to form phosgene & hydrogen chloride. Corrosive to metals.]

### Measurement Methods

OSHA PV2017

See: NMAM or OSHA Methods

### Personal Protection & Sanitation (See protection)

Skin: Prevent skin contact

Eyes: Prevent eye contact

Wash skin: When contaminated

Remove: When wet or contaminated

Change: Daily

Provide: Eyewash, Quick drench

### First Aid (See procedures)

Eye: Irrigate immediately

Skin: Water flush immediately

Breathing: Respiratory support

Swallow: Medical attention immediately

### Respirator Recommendations Not available.

Important additional information about respirator selection

### Exposure Routes inhalation, ingestion, skin and/or eye contact

**Symptoms** Irritation eyes, skin, nose, throat, respiratory system; cough, dyspnea (breathing difficulty), delayed pulmonary edema; eye, skin burns; dermatitis; salivation, vomiting, diarrhea

### Target Organs Eyes, skin, respiratory system, gastrointestinal tract

See also: INTRODUCTION See ICSC CARD: 0586

# NIOSH Pocket Guide to Chemical Hazards

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## 1,2-Dichloroethylene

CAS 540-59-0

CICH=CHCl

RTECS KV9360000

### Synonyms & Trade Names

Acetylene dichloride, cis-Acetylene dichloride, trans-Acetylene dichloride, sym-Dichloroethylene

### DOT ID & Guide

1150 130P

### Exposure Limits

NIOSH REL: TWA 200 ppm (790 mg/m<sup>3</sup>)

OSHA PEL: TWA 200 ppm (790 mg/m<sup>3</sup>)

IDLH 1000 ppm See: 540590

Conversion 1 ppm = 3.97 mg/m<sup>3</sup>

### Physical Description

Colorless liquid (usually a mixture of the cis & trans isomers) with a slightly acrid, chloroform-like odor.

MW: 97.0

BP: 118-140°F

FRZ: -57 to -115°F

Sol: 0.4%

VP: 180-265 mmHg

IP: 9.65 eV

Sp.Gr(77°F): 1.27

F.L.P: 36-39°F

UEL: 12.8%

LEL: 5.6%

Class IB Flammable Liquid: F.L.P. below 73°F and BP at or above 100°F.

### Incompatibilities & Reactivities

Strong oxidizers, strong alkalis, potassium hydroxide, copper [Note: Usually contains inhibitors to prevent polymerization.]

### Measurement Methods

NIOSH 1003; OSHA 7

See: NMAM or OSHA Methods

### Personal Protection & Sanitation (See protection)

Skin: Prevent skin contact

Eyes: Prevent eye contact

Wash skin: When contaminated

Remove: When wet (flammable)

Change: No recommendation

### First Aid (See procedures)

Eye: Irrigate immediately

Skin: Soap wash promptly

Breathing: Respiratory support

Swallow: Medical attention immediately

### Respirator Recommendations NIOSH/OSHA

#### Up to 2000 ppm:

(APF = 25) Any supplied-air respirator operated in a continuous-flow mode<sup>£</sup>

(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s)<sup>£</sup>

(APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s)

(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister

(APF = 50) Any self-contained breathing apparatus with a full facepiece

(APF = 50) Any supplied-air respirator with a full facepiece

#### Emergency or planned entry into unknown concentrations or IDLH conditions:

(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

#### Escape:

(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Important additional information about respirator selection

### Exposure Routes inhalation, ingestion, skin and/or eye contact

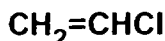
### Symptoms Irritation eyes, respiratory system; central nervous system depression

# NIOSH Pocket Guide to Chemical Hazards

NPG Home | Introduction | Synonyms & Trade Names | Chemical Names | CAS Numbers | RTECS Numbers | Appendices | Search

## Vinyl chloride

CAS 75-01-4



RTECS KU9625000

### Synonyms & Trade Names

Chloroethene, Chloroethylene, Ethylene monochloride, Monochloroethene, Monochloroethylene, VC, Vinyl chloride monomer (VCM)

### DOT ID & Guide

1086 116P (inhibited)

### Exposure Limits

NIOSH REL: Ca See Appendix A

OSHA PEL: [1910.1017] TWA 1 ppm C 5 ppm [15-minute]

IDLH Ca [N.D.] See: IDLH INDEX

Conversion 1 ppm = 2.56 mg/m<sup>3</sup>

### Physical Description

Colorless gas or liquid (below 7°F) with a pleasant odor at high concentrations. [Note: Shipped as a liquefied compressed gas.]

MW: 62.5

BP: 7°F

FRZ: -256°F

Sol(77°F): 0.1%

VP: 3.3 atm

IP: 9.99 eV

RGasD: 2.21

FLP: NA (Gas)

UEL: 33.0%

LEL: 3.6%

Flammable Gas

### Incompatibilities & Reactivities

Copper, oxidizers, aluminum, peroxides, iron, steel [Note: Polymerizes in air, sunlight, or heat unless stabilized by inhibitors such as phenol. Attacks iron & steel in presence of moisture.]

### Measurement Methods

NIOSH 1007; OSHA 4, 75

See: NMAM or OSHA Methods

### Personal Protection & Sanitation (See protection)

Skin: Frostbite

Eyes: Frostbite

Wash skin: No recommendation

Remove: When wet (flammable)

Change: No recommendation

Provide: Frostbite wash

### First Aid (See procedures)

Eye: Frostbite

Skin: Frostbite

Breathing: Respiratory support

### Respirator Recommendations (See Appendix E) NIOSH

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration:

(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

#### Escape:

(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern/Any appropriate escape-type, self-contained breathing apparatus

Important additional information about respirator selection

### Exposure Routes inhalation, skin, and/or eye contact (liquid)

**Symptoms** Lassitude (weakness, exhaustion); abdominal pain, gastrointestinal bleeding; enlarged liver; pallor or cyanosis of extremities; liquid: frostbite; [potential occupational carcinogen]

**Target Organs** Liver, central nervous system, blood, respiratory system, lymphatic system

**Cancer Site** [liver cancer]

**ATTACHMENT B**  
**MATERIAL SAFETY DATA SHEETS**

**(Attach MSDSs)**

## ALCONOX MSDS

### Section 1: PRODUCT INFORMATION

**Chemical family:** Detergent.

**Product name:** Alconox

**Manufacturer:** Alconox, Inc.  
30 Glenn St.  
Suite 309  
White Plains, NY 10603.

**Manufacturer emergency** 800-255-3924.

**phone number:** 813-248-0585 (outside of the United States).

**Supplier:** Same as manufacturer.

**TDG classification:** Not regulated.

**WHMIS classification:**

D2B



**DSL status:** The supplier has certified that all substances in this product appear on the domestic substances list.

**Supplier MSDS date:** 2005/03/09

### Section 2: HAZARDOUS INGREDIENTS

C.A.S.	CONCENTRATION %	Ingredient Name	T.L.V.	LD/50	LC/50
25155-30-0	10-30	SODIUM DODECYLBENZENESULFONATE	NOT AVAILABLE	438 MG/KG RAT ORAL  1330 MG/KG MOUSE ORAL	NOT AVAILABLE
497-19-8	7-13	SODIUM CARBONATE	NOT AVAILABLE	4090 MG/KG RAT ORAL  6600 MG/KG MOUSE ORAL	2300 MG/M3/2H RAT INHALATION 1200 MG/M3/2H MOUSE INHALATION
7722-88-5	10-30	TETRASODIUM PYROPHOSPHATE	5 MG/M3	4000 MG/KG RAT ORAL  2980 MG/KG MOUSE ORAL	NOT AVAILABLE



7758-29-4	10-30	SODIUM PHOSPHATE	NOT AVAILABLE	3120 MG/KG RAT ORAL	NOT AVAILABLE
				3100 MG/KG MOUSE ORAL	
				>4640 MG/KG RABBIT DERMAL	

### Section 2A: ADDITIONAL INGREDIENT INFORMATION

**Note:** (supplier).

CAS# 497-19-8: LD50 4020 mg/kg - rat oral.

CAS# 7758-29-4: LD50 3100 mg/kg - rat oral.

### Section 3: PHYSICAL DATA

**Physical state:** Solid

**Appearance & odor:** Almost odourless.  
White granular powder.

**Odor threshold (ppm):** Not available.

**Vapour pressure (mmHg):** Not applicable.

**Vapour density (air=1):** Not applicable.

**By weight:** Not available.

**Evaporation rate (butyl acetate = 1):** Not applicable.

**Boiling point (°C):** Not applicable.

**Freezing point (°C):** Not applicable.

**pH:** (1% aqueous solution).  
9.5

**Specific gravity @ 20 °C:** (water = 1).  
0.85 - 1.10

**Solubility in water (%):** 100 - > 10% w/w

**Coefficient of water\oil dist.:** Not available.

**VOC:** None

### Section 4: FIRE & EXPLOSION DATA

**Flammability:** Not flammable.

**Conditions of flammability:** Surrounding fire.

**Extinguishing media:** Carbon dioxide, dry chemical, foam.  
Water  
Water fog.

**Special procedures:** Self-contained breathing apparatus required.  
Firefighters should wear the usual protective gear.

**Auto-ignition temperature:** Not available.

**Flash point (°C), method:** None

**Lower flammability limit (% vol):** Not applicable.

**Upper flammability limit (% vol):** Not applicable.

**Explosion Data**

**Sensitivity to static discharge:** Not available.

**Sensitivity to mechanical impact:** Not applicable.

**Hazardous combustion products:** Oxides of carbon (COx).  
Hydrocarbons.

**Explosive power:** None

**Section 5: REACTIVITY DATA**

**Chemical stability:** Stable under normal conditions.

**Conditions of instability:** None known.

**Hazardous polymerization:** Will not occur.

**Incompatible substances:** Strong acids.  
Strong oxidizers.

**Hazardous decomposition products:** See hazardous combustion products.

**Section 6: TOXICOLOGICAL PROPERTIES**

**Route of entry:** Skin contact, eye contact, inhalation and ingestion.

**Effects of acute exposure**

**Eye contact:** May cause irritation.

**Skin contact:** Prolonged contact may cause irritation.

**Inhalation:** Airborne particles may cause irritation.

**Ingestion:** May cause vomiting and diarrhea.  
May cause abdominal pain.  
May cause gastric distress.

**Effects of chronic exposure:** Contains an ingredient which may be corrosive.

**LD50 of product, species & route:** > 5000 mg/kg rat oral.

**LC50 of product, species & route:** Not available for mixture, see the ingredients section.

**Exposure limit of material:** Not available for mixture, see the ingredients section.

**Sensitization to product:** Not available.

**Carcinogenic effects:** Not listed as a carcinogen.

**Reproductive effects:** Not available.

**Teratogenicity:** Not available.

**Mutagenicity:** Not available.

**Synergistic materials:** Not available.

**Medical conditions aggravated by exposure:** Not available.

## Section 7: PREVENTATIVE MEASURES

### Precautionary Measures

**Gloves/Type:**



Neoprene or rubber gloves.

**Respiratory/Type:**



If exposure limit is exceeded, wear a NIOSH approved respirator.

**Eye/Type:**



Safety glasses with side-shields.

**Footwear/Type:** Safety shoes per local regulations.

**Clothing/Type:** As required to prevent skin contact.

**Other/Type:** Eye wash facility should be in close proximity.  
Emergency shower should be in close proximity.

**Ventilation requirements:** Local exhaust at points of emission.

**Leak/Spill:** Contain the spill.  
Recover uncontaminated material for re-use.  
Wear appropriate protective equipment.  
Contaminated material should be swept or shoveled into appropriate waste container for disposal.

**Waste disposal:** In accordance with municipal, provincial and federal regulations.

**Handling procedures and equipment:** Protect against physical damage.  
Avoid breathing dust.  
Wash thoroughly after handling.  
Keep out of reach of children.  
Avoid contact with skin, eyes and clothing.  
Launder contaminated clothing prior to reuse.

**Storage requirements:** Keep containers closed when not in use.  
Store away from strong acids or oxidizers.  
Store in a cool, dry and well ventilated area.

**TDG classification:** Not regulated.

**Special shipping information:** Not regulated.

#### **Section 8: FIRST AID MEASURES**

- Skin contact:** Remove contaminated clothing.  
Wash thoroughly with soap and water.  
Seek medical attention if irritation persists.
- Eye contact:** Check for and remove contact lenses.  
Flush eyes with clear, running water for 15 minutes while holding eyelids open: if irritation persists, consult a physician.
- Inhalation:** Remove victim to fresh air.  
Seek medical attention if symptoms persist.
- Ingestion:** Dilute with two glasses of water.  
Never give anything by mouth to an unconscious person.  
Do not induce vomiting, seek immediate medical attention.

**Additional information:** The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. This company shall not be held liable for any inaccuracies.

#### **Section 9: ADDITIONAL INFORMATION**

**General note:** This material safety data sheet was prepared from information obtained from various sources, including product suppliers and the Canadian Center for Occupational Health and Safety.

**MSDS**Definition  
of terms**Material Safety Data Sheet for #2 Diesel****1. Chemical Product****MSDS Number:** U7770**MSDS Date:** 01-31-99**Product Name:** #2 Diesel Fuel

24 Hour Emergency Phone: (210) 979-8346  
Transportation Emergencies: Call Chemtrec at 1-800-424-9300  
MSDS Assistance: (210) 592-4593

**Distributors Name and Address:**

T.W. Brown Oil Co., Inc.  
1857 Knoll Drive  
Ventura, California 93003

**Chemical Name:** #2 Diesel Fuel**Cas Number:** 68476-34-6

**Synonyms/Common Names:** This Material Safety Data Sheet applies to the following product descriptions for Hazard Communication purposes only. Technical specifications vary greatly depending on the product, and are not reflected in this document. Consult specification sheets for technical information.

**California Air Resources Board (Carb) Diesel Fuel-** On-road, Off-Road, Tax Exempt blends

**Premium Diesel Fuel-** Low-Sulfur, High-sulfur, On-Road, Off-Road, Tax Exempt blends

**#2 Distillate-** Low-Sulfur, High-sulfur, On-Road, Off-Road, Tax Exempt blends

**#2 Diesel Fuel-** Low-Sulfur, High-sulfur, On-Road, Off-Road, Tax Exempt blends

**#2 Fuel Oil-** Low-Sulfur, High-sulfur, On-Road, Off-Road, Tax Exempt blends

**2. Composition, Information On Ingredients**

**Product Use:** This product is intended for use as a fuel in engines and heaters designed for diesel fuels, and for use in engineered processes. Use in other applications may result in higher exposures and require additional controls, such as local exhaust ventilation and personal protective equipment.

**Description:** #2 Diesel is a complex mixture of hydrocarbons from a variety of chemical processes blended to meet standardized product specifications. Composition varies greatly and includes C9 to C20 hydrocarbons with a boiling range of about 325-675 degrees F. The following is a non-exhaustive list of common components, typical percentage ranges in product, and occupational exposure limits for each.

Component or Material Name	%	CAS Number	ACGIH Limits TLV -- STEL -- Units	OSHA Exposure Limits PEL -- STEL -- C/P -- Units
Cat cracked distillate, light	0-100	64741-59-9	100 -- NA -- mg/m3	N/A -- N/A -- N/A -- N/A
Hydrotreated distillate, middle	0-100	64742-46-7	100 -- NA -- mg/m3	N/A -- N/A -- N/A -- N/A

Hydrotreated distillate, light	0-100	64742-47-8	100 -- NA -- mg/m3	N/A -- N/A -- N/A -- N/A
Gas oil, light	0-100	64741-44-2	100 -- NA -- mg/m3	N/A -- N/A -- N/A -- N/A

### 3. Hazards Identification

#### Health Hazard Data:

1. The major effect of exposure to this product is giddiness, headache, central nervous system depression; possible irritation of eyes, nose, and lungs; and dermal irritation. Signs of kidney and liver damage may be delayed. Pulmonary irritation secondary to exhalation fo solvent.
2. NIOSH recommends that whole diesel engine exhaust be regarded as a potential occupational carcinogen. Follow OSHA and NSHA rules where diesel engine exhaust fumes may be generated.
3. A life time skin painting study by the American Petroleum Institute has shown that similar naphtha products with a boiling range of 350-700 degrees F usually produce skin tumors and/ or skin cancers in laboratory mice. Only a weak to moderate response occurred. The effect to humans has not been determined.
4. Positive results at 2.0 ml/kg and 6.0 ml/kg noted in mutagenesis studies via in-vivo bone marrow cytogenetics assay in rats.
5. Kerosene is classified as a severe skin irritant. Mutation data has been reported for kerosene products. Hydrotreated kerosene is listed as being probably carcinogenic to humans with limited evidence in humans and sufficient evidence in experimental animals.

**Hazards of Combustion Products:** Carbon monoxide and carbon dioxide can be found in the combustion products of this product and other forms of hydrocarbon combustion. Carbon monoxide in moderate concentrations can cause symptoms of headache, nausea, vomiting, increased cardiac output, and confusion. Exposure to higher concentrations of carbon monoxide can cause loss of consciousness, heart damage, brain damage, and/or death. Exposure to high concentrations of carbon dioxide can cause simple asphyxiation by displacing available oxygen. Combustion of this and other similar materials should only be carried out in well ventilated areas.

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## MSDS

Definition  
of terms

## Material Safety Data Sheet #2 Diesel

**Medical Condition Generally Aggravated By Exposure:** Medical conditions which have the same symptoms and effects as those outlined under the health hazard information section can be aggravated by exposure to this product.

**Medical Limitation:** N/A

### Routes Of Exposure

**Inhalation:** Irritation of the upper respiratory tract and eyes, with possible euphoria, dizziness, headache, discoordination, ringing in the ears, convulsions, coma, and respiratory arrest.

**Skin Contact:** Defatting of the skin may occur with continued and prolonged contact. Irritation and burning sensation may occur on exposure to the liquid or mists.

**Skin Absorption:** Not significant.

**Eye Contact:** Severe burning sensation with temporary irritation and swelling of lids.

**Ingestion:** Irritation of the mucous membranes of throat, esophagus and stomach which may result in nausea and vomiting; central nervous system depression may occur, if absorbed (see inhalation symptoms above). If aspirated, chemical pneumonitis may occur with potentially fatal results. Possible kidney and liver damage may be delayed. (See Notes to Physician in Section 5)

**Carcinogenicity Statement:** #2 Diesel is not listed as carcinogenic by NTP, OSHA, and ACGIH. IARC has listed kerosene and light catalytic cracked distillates as a probable human carcinogen. Light paraffinic hydrotreated petroleum distillates are listed as confirmed human carcinogens by IARC.

### 4. First Aid Measures

**Eyes:** Immediately flush eyes with large amount of water for at least 15 minutes holding lids apart to ensure flushing of the entire eye surface. **SEEK IMMEDIATE MEDICAL ATTENTION.**

**Skin:** Wash contaminated areas with plenty of soap and water. A soothing ointment may be applied to irritated skin after thoroughly cleansing. Remove contaminated clothing and footwear. **SEEK IMMEDIATE MEDICAL ATTENTION.**

**Inhalation:** Get person out of contaminated area to fresh air. If breathing has stopped resuscitate and administer oxygen if readily available. **SEEK MEDICAL ATTENTION IMMEDIATELY.**

**INGESTION:** Never give anything by mouth to an unconscious person. If swallowed, do not induce vomiting. If vomiting occurs spontaneously, keep airway clear. **SEEK MEDICAL ATTENTION IMMEDIATELY.**

**Note to Physician:** Do not induce vomiting, use gastric lavage only. Aspiration of liquid into the lungs could result in Chemical pneumonitis. Use of adrenaline is not advised. Treat symptomatically.

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## 5. Fire and Explosion Data

**Flash Point:** 100 degrees F PM (minimum)

**Autoignition Temperature:** 494 degrees F

**Flammable Limits In Air:** UEL: 5% - LEL: 0.7%

**Extinguishing Media:** Use dry chemical, carbon dioxide, foam or water spray. Water may be ineffective in fighting fires of liquids with low flash points, but water should be used to keep fire exposed containers cool. If a leak or spill has not ignited, use water spray to disperse the vapors and to protect persons attempting to stop a leak.

**Special Fire Fighting Procedures:** Pressure-demand, self contained, breathing apparatus should be provided for fire fighters in buildings or confined areas where product is stored.

**Unusual Fire And Explosion Hazard:** Vapor accumulation is possible, and flashback can occur with explosive force if vapors are ignited.

## 6. Accidental Release Measures

If material is spilled, steps should be taken to contain liquid and prevent discharges to streams or sewer systems and control or stop the loss of volatile materials to the atmosphere. Spills or releases should be reported, if required to the appropriate local, state and federal regulatory agencies.

**Small Spills:** Remove ignition sources. Absorb spilled material with non-combustible materials such as cat litter, dirt, sand, or petroleum sorbent pads/pillows. Do not use combustible materials like rags, wood chips, or saw dust. Remove contaminated materials to an appropriate disposal container.

**Large Spills:** Remove ignition sources. Dike spill area with sand or dirt to contain material and cover sewers/drains. Remain upwind and keep unnecessary people away. Contact trained emergency response team for cleanup. Remove liquid using grounded suction pumps, isolate hazard area and deny entry.

## 7. Handling and Storage Information

Store only in approved containers. Protect containers against physical damage. Outside or detached storage is preferred. Separate from oxidizing materials. Store in cool, well ventilated area of non-combustible construction away from possible sources of ignition. Keep away from incompatible materials and follow OSHA 29 CFR 1910.106 and NFPA 30 for storage requirements.

**Product Use:** This product is intended for use as a fuel in engines and heaters designed for kerosene or diesel fuels, and for use in engineered processes. Use in other applications may result in higher exposures and require additional controls, such as local exhaust ventilation and personal protective equipment.

## 8. Exposure Controls/Personal Protection

**Ventilation Requirements:** Work in well ventilated areas using good engineering practices to process, transfer and store. Special ventilation is not required unless

product is sprayed or heated. High volume use may require engineering controls.

### **Specific Personal Protective Equipment**

**Respiratory:** Respiratory protection is not required unless product is sprayed or heated. Use NIOSH approved respiratory protection following manufacture's recommendations where spray, mists, or vapors may be generated. Supplied air respiratory protection is required for IDLH areas. See 29 CFR 1910.134 for OSHA Respirator Protection regulations.

**Eye:** Face shield and goggles or chemical goggles should be worn where mist or spray may be generated, and where splashing occurs. Shower and eyewash facilities should be accessible.

**Gloves:** Impermeable protective gloves such as nitrile gloves should be worn during routine handling of this product. Barrier creams may also be appropriate where tactile sensitivity is required.

**Other Clothing and Equipment:** Clothing contaminated with this product should be removed and laundered before reuse. Items which can not be laundered should be discarded. Allow contaminated items to air dry or hang in a well ventilated area. Spontaneous combustion or fire may result from contaminated materials being placed together before drying.

### **Exposure Monitoring**

**Biological:** No applicable procedure, breath analysis for hydrocarbons has been suggested.

**Personal/Area:** Based on similarity to kerosene, both active and passive monitors employing charcoal adsorption follow by gas chromatography. An average molecular weight of 170 has been suggested as the average value to convert the determined weight of hydrocarbons to ppm. Direct reading colorimetric tubes are available to evaluate short term exposure.

## **9. Physical and Chemical Properties**

**Appearance and Odor:** Colorless to straw, or red oily liquid with characteristic kerosene-like odor.

**Viscosity:** Specification dependent, 1.7 - 3.4 cSt @ 140 degrees F

**Boiling Range @ 760 mm Hg:** 302-644 degrees F

**Vapor Density (Air=1):** 4.5 (kerosene)

**Evaporation Rate (BuAc=1):** N/A

**Specific Gravity (H2O=1):** 0.865

**Bulk Density At 60 degrees F:** 6.8-7.2 lbs./gal.

**Solubility in H2O % by WT.:** Insoluble

**Freezing Point:** -51 degrees F

**Vapor Pressure:** 0.5 mmHg @ 20 degrees C

**% Volatiles By Vol.:** N/A

**API Gravity:** Specification dependent

**pH:** NA

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## MSDS

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## Material Safety Data Sheet for #2 Diesel

### 10. Stability and Reactivity Information

**Conditions Contributing to Instability:** Under normal conditions, the material is stable. Avoid sources of ignition such as flames, hot surfaces, sparks, and electrical equipment.

**Incompatibility:** Avoid contact with strong oxidizers such as chlorine, concentrated oxygen, and sodium hypochlorite or other hypochlorites.

**Hazardous Decomposition Products:** Thermal decomposition products may include carbon monoxide, carbon dioxide, oxides of sulfur and nitrogen, and other toxic gases

**Hazardous Polymerization:** Material is not known to polymerize.

### 11. Toxicological Information

For detailed information, contact MSDS Assistance at (210) 592-4593

### 12. Ecological Information

For detailed information, contact MSDS Assistance at (210) 592-4593

### 13. Disposal Considerations

Shipment, storage, disposal, and cleanup actions of waste materials are regulated under local, state and federal rules. Contact the appropriate agencies if uncertain of applicability. Waste product and contaminated material having a flash point below 140 degrees F is considered a hazardous waste. DOT Hazardous Waste Number D001 applies. Consult 40 CFR 262 for EPA disposal requirements.

### 14. Transport Information

DOT Proper Shipping Name	Combustible Liquid, n.o.s	Diesel Fuel
DOT Hazard Class*	Combustible Liquid	3*
DOT Packing Group (PG)	III	III
I.D. Number	UN 1993	NA 1993
Required Labeling	None	Flammable Liquid

\* Since this product has a flash point >100 degrees F and no other hazard class applies, it may be reclassified as Combustible Liquid and NA 1993 substituted for the product specific I.D.

Number above. Consult 49 CFR 173.120 for specific details.

### 15. Regulatory Information

### **TSCA (Toxic Substance Control Act) Inventory**

Gasoline is listed in the TSCA inventory.

### **SARA (Superfund Amendments and Reauthorization Act) TITLE III**

This product is reportable under SARA Title III, Sections 311 & 312 as a hazardous substance.

#### **Hazard Categories Applicable under 40 DFR 370.2 (SARA Section 311):**

Acute Health	Chronic Health	Pressure	Fire	Reactive
Yes	Yes	No	Yes	No

#### **Components Listed under 40 CFR 372.65 (SARA Section 313):**

This product does not contain chemicals identified as toxic by EPA under CFR part 372 and is not subject to the reporting requirements of this section.

#### **State Regulations:**

**California Proposition 65:** This product does not contain chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm.

## **16. Other Information**

#### **NFPA (National Fire Protection Association) Hazard Ratings Codes\***

Fire	Health	Reactivity	Other
2	1	0	Blank

\*Based on Standard System for the Identification of the Fire Hazards of Materials, NFPA No. 704 M

This material safety data sheet was prepared by T. W. Brown Oil Co., Inc. in accordance with 29 CFR 1910.1200. All information, recommendations and suggestions appearing herein concerning this product are based upon tests and data believed to be reliable, however, it is the user's responsibility to determine the safety, toxicity and suitability for his own use of the product described herein. Since the actual use by others is beyond our control, no guarantee expressed or implied is made by T. W. Brown Oil Co., Inc. as to the effects of such use, the results to be obtained or the safety and toxicity of the product nor does T. W. Brown Oil Co., Inc. assume any liability arising out of use by others of the product referred to herein. Nor is the information herein to be construed as absolutely complete since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable

laws or government regulations.

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**MSDS**  
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## Material Safety Data Sheet for Gasoline

### 1. Chemical Product

**MSDS Number:** U4080

**MSDS Date:** 01-1-99

**Product Name:** Gasoline

**24 Hour Emergency Phone: (210) 979-8346**  
**Transportation Emergencies: Call Chemtrec at 1-800-424-9300**  
MSDS Assistance: (210) 592-4593

#### **Distributors Name and Address:**

T.W. Brown Oil Co., Inc.  
1857 Knoll Drive  
Ventura, California 93003

**Chemical Name:** Gasoline

**Cas Number:** 8006-61-9

**Synonyms/Common Names:** This Material Safety Data Sheet applies to the following product descriptions for Hazard Communication purposes only. Technical specifications vary greatly depending on the product, and are not reflected in this document. Consult specification sheets for technical information.

**Unleaded Gasoline Blendstocks/Subgrades-** all types, grades, octanes, and vapor pressures.

**California Air Resources Board (Carb) Gasoline-** all grades, octanes, vapor pressures, and oxygenate blends.

**Reformulated Gasoline (RFG)-**all grades, octanes, vapor pressures, and oxygenate blends.

**California Reformulated Gasoline (CARFG)-**all grades, octanes, vapor pressures, and oxygenate blends.

**Conventional Gasoline-**all grades, octanes, vapor pressures, and oxygenate blends.

### 2. Composition, Information On Ingredients

**Product Use:** This product is intended for use as a fuel in engines or for use in engineered processes. Use in other applications may result in higher exposures and require additional controls, such as local exhaust ventilation and personal protective equipment.

**Description:** Reformulated gasoline is a complex mixture of hydrocarbons from a variety of chemical processes blended to meet standardized product specifications. Composition varies greatly and includes C<sub>7</sub> to C<sub>12</sub> hydrocarbons with a boiling range of about 80-473 degrees F. The following is a non-exhaustive list of common components, typical percentage ranges in product, and occupational exposure limits for each. Functional and performance additives may also be present at concentrations below reporting thresholds.

Component or Material Name	%	CAS Number	ACGIH Limits	OSHA Exposure Limits
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			TLV -- STEL -- Units	PEL -- STEL -- C/P -- Units
Gasoline	90-100	Mixture	300-500-ppm	NA-NA-NA ----
Butane	<9	106-97-8	800-NA-ppm	NA-NA-NA ----
Pentane	<6	109-66-0	600-750-ppm	1000-NA-NA-ppm
n-Hexane	<4	110-54-3	50-NA-ppm	500-NA-NA-ppm
Hexan(other isomers)	<8	NA	500-1,000-ppm	NA-NA-NA ----
Benzene	1.2 - 4.9	7-4-2	0.5-2.5-ppm	1-5-NA-ppm
N-heptane	<2	14-82-5	400-500-ppm	500-NA-NA-ppm
Ethylbenzene	<2	100-41-4	100-125-ppm	100-NA-NA-ppm
Xylene (o,m,p, - isomers)	<11	1330-20-7	100-150-ppm	100-NA-NA-ppm
Cyclohexane	<2	110-82-7	300-NA-ppm	300-NA-NA-ppm
Trimethylbenzene	<4	25551-13-7	25-NA-ppm	NA-NA-NA ----
Methyl-t-butyl ether (MTBE)	0-15	1634-04-4	40-NA-ppm	NA-NA-NA ----
Toluene	<12	108-88-3	50-NA-ppm	200-300/500-NA-ppm
Ethyl-t-butyl ether (ETBE)	0-7	637-92-3	N/A-NA-ppm	NA-NA-NA ----
t-amyl-methyl-ether	0-5	994-05-8	N/A-NA-ppm	NA-NA-NA ----
Ethanol	0-11	64-17-5	1,000-NA-ppm	1,000-NA-NA-ppm

C=Ceiling concentration not to be exceeded at any time. P= Peak concentration for a single 10 minute exposure per day.

### 3. Hazards Identification

#### Health Hazard Data:

1. The major effect of exposure to this product is central nervous system depression and polyneuropathy.
2. Studies have shown that repeated exposure of laboratory animals to high concentrations of whole gasoline vapors at 67,262 and 2056 ppm has caused kidney damage and cancer of the kidney in rats and liver cancer in mice.
3. LARC has listed gasoline as possibly carcinogenic (2B) to humans with limited evidence in humans in the absence of sufficient evidence in experimental animals. NIOSH lists gasoline as a carcinogen with no further classification.
4. N-heptane and cyclohexane cause narcosis and irritation of eyes and mucous membranes. Cyclohexane has been reported to cause liver and kidney changes in rabbits. N-heptane has been reported to cause polyneuritis following prolonged exposure.
5. ACGIH lists benzene a human carcinogen with and assigned TLV of 0.5 ppm 8 hour TWA and a STEL of 2.5 ppm; IARC, NTP & OSHA show sufficient evidence for classifying Benzene as a human carcinogen, see 29 CFR 1910.1028 for current PEL of 1 ppm and specific actions to take. Studies have shown that benzene can induce leukemia at concentrations as low as 1 ppm. Significant elevations of chromosomal aberrations have been corroborated among workers exposed to levels at mean concentrations less than 10 ppm. Based on risk assessment studies by Rinsky, an individual inhaling 1 ppm of benzene for 40 years, the odds of benzene-induced leukemic death were 1.7 times higher than those of unexposed workers.
6. MTBE is a mild irritant to the eye with an LC50 of 85 mg/m<sup>3</sup> on 4 hr. exposure and an LD50 ~4 ml/Kg (RATS). An increase in anesthesia with increasing

concentration (250,500 & 1000 ppm ) was observed during a 90 day Test exposure. ACGIH has listed MTBE as an animal carcinogen (A3) based on tests in experimental animals at relatively high dose levels, by routes of administration, at sites, of histologic types, or by mechanisms not considered relevant to worker exposure. Available evidence suggests that MTBE is not likely to cause cancer in humans except under uncommon or unlikely routes of levels of exposure.

7. Trimethylbenzene (pseudocumene (1,2,4,) & mesitylene (1,2,5,)) has a PEL and TLV of 25 ppm 8 hr. TWA; the isomers may cause nervousness, tension, and anxiety and asthmatic bronchitis.

8. n-Hexane has been shown to cause polyneuropathy (peripheral nerve damage) after repeated and prolonged exposure, other hexanes show narcotic effects at 1000 ppm and are not metabolized like n-hexane.

9. Toluene can cause impairment of coordination and momentary loss of memory (200-500 ppm); Palpitations, extreme weakness and pronounced loss of coordination (500-1500). The 100 ppm 8 hr. TWA and the 150 ppm STEL provides adequate protection.

10. The toxicological effects of ETBE and TAME have not been thoroughly investigated. ETBE and TAME are expected to be an inhalation hazard and a severe eye and moderate skin irritant.

**Hazards of Combustion Products:** Carbon monoxide and carbon dioxide can be found in the combustion products of this product and other forms of hydrocarbon combustion. Carbon monoxide in moderate concentrations can cause symptoms of headache, nausea, vomiting, increased cardiac output, and confusion. Exposure to higher concentrations of carbon monoxide can cause loss of consciousness, heart damage, brain damage, and/or death. Exposure to high concentrations of carbon dioxide can cause simple asphyxiation by displacing available oxygen. Combustion of this and other similar materials should only be carried out in well ventilated areas.

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## Material Safety Data Sheet Gasoline

**Medical Condition Generally Aggravated By Exposure:** Medical conditions which have the same symptoms and effects as those outlined under the health hazard information section can be aggravated by exposure to this product.

**Medical Limitation:** N/A

### Routes Of Exposure

**Inhalation:** Irritation of the upper respiratory tract with central nervous system stimulation possible followed by depression, dizziness, headache, incoordination, anaesthesia, coma, and respiratory arrest. The threshold for immediate mild toxic effects is reported to be 900-1000 ppm.

**Skin Contact:** Defatting of the skin may occur with continued and prolonged contact. Irritation and burning sensation may occur on exposure to the liquid or high vapor phase exposure..

**Skin Absorption:** Benzene is absorbed directly through intact skin.

**Eye Contact:** Contact with liquid will cause severe burning sensation with temporary irritation and swelling of lids. Vapor in concentrations of 160-270 ppm in air will irritate the eye.

**Ingestion:** Irritation of the mucous membranes of throat, esophagus and stomach which may result in nausea and vomiting; depression may occur, if absorbed (see inhalation symptoms above). If aspirated, chemical pneumonitis may occur with potentially fatal results.

**Carcinogenicity Statement:** Gasoline mixtures are not listed as carcinogenic by NTP, OSHA, and ACGIH. Gasoline mixtures are listed as a possible carcinogen by IARC (2B) and NIOSH. Benzene is listed as a confirmed human carcinogen by IARC, NTP, OSHA, NIOSH, and ACGIH.

### 4. First Aid Measures

**Eyes:** Immediately flush eyes with large amount of water for at least 15 minutes holding lids apart to ensure flushing of the entire eye surface. **SEEK IMMEDIATE MEDICAL ATTENTION.**

**Skin:** Wash contaminated areas with plenty of soap and water. A soothing ointment may be applied to irritated skin after thoroughly cleansing. Remove contaminated clothing and footwear. **SEEK IMMEDIATE MEDICAL ATTENTION.**

**Inhalation:** Get person out of contaminated area to fresh air. If breathing has stopped resuscitate and administer oxygen if readily available. **SEEK MEDICAL ATTENTION IMMEDIATELY.**

**Ingestion:** Never give anything by mouth to an unconscious person. If swallowed, do not induce vomiting. If vomiting occurs spontaneously, keep airway clear. **SEEK**

**MEDICAL ATTENTION IMMEDIATELY.**

**Note to Physician:** Gastric lavage only if large quantity has been ingested. Guard against aspiration into lungs which may result in chemical pneumonitis. Irregular heart beat may occur, use of adrenaline is not advised. Treat symptomatically.

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**Material Safety Data Sheet for Gasoline****5. Fire and Explosion Data**

**Flash Point:** <-40 degrees (Estimated)

**Autoignition Temperature:** 480 degrees F

**Flammable Limits In Air:** UEL: 7.1% - LEL: 1.3%

**Extinguishing Media:** Use dry chemical, carbon dioxide, foam or water spray. Water may be ineffective in fighting fires of liquids with low flash points, but water should be used to keep fire exposed containers cool. If a leak or spill has not ignited, use water spray to disperse the vapors and to protect persons attempting to stop a leak.

**Special Fire Fighting Procedures:** Pressure-demand, self contained, breathing apparatus should be provided for fire fighters engaged in activities in the hot zone.

**Unusual Fire And Explosion Hazard:** Vapors may travel extended distances and flashback with explosive force if ignition sources are present. Clothing, rags, or similar organic material contaminated with the product and stored in a closed space may undergo spontaneous combustion.

**6. Accidental Release Measures**

Eliminate all sources of ignition (flames, sparks, heat, electrical equipment, and engines) and remove non-response personnel from the spill area. Contain liquids with earthen dikes or petroleum absorbent materials. Prevent discharges to streams or sewer systems. Control vapors from large spills with fire-fighting foam. Remove liquid with explosion-proof equipment and grounded and bonded suction hoses. Report spills or releases as required to the appropriate local, state and federal regulatory agencies.

**7. Handling and Storage Information**

This product is intended for use as engine fuel only. Protect containers against physical damage. Outside or detached storage or underground storage is preferred. Separate from oxidizing materials. Store in cool, well ventilated area of non-combustible construction away from possible sources of ignition (flames, sparks, heat, electrical equipment, and engines). Transfer with explosion-proof equipment and grounded and bonded transfer lines. Consult NFPA 30 and OSHA 1910.106 for specific requirements.

**8. Exposure Controls/Personal Protection**

**Ventilation Requirements:** Work in well ventilated areas using good engineering practices to process, transfer and store. Explosion-proof equipment is required. Vapor recovery systems may be required in some areas. Mechanical ventilation is required for confined spaces such as tanks and vessels.

**Specific Personal Protective Equipment**

**Respiratory:** Respiratory protection is not normally not required when transferring material in well ventilated areas. When transferring in enclosed areas or at high temperatures, vapors concentrations may warrant use of respiratory equipment. Use NIOSH approved respiratory protection following manufacture's recommendations.

Positive pressure supplied air **respiratory** protection is required for IDLH areas; follow ANSI Z88.2

**Eye:** Face shield and goggles or **chemical** goggles should be worn where splashing is likely.

**Gloves:** Impermeable protective gloves such as nitrile gloves should be worn during routine handling of this product.

**Other Clothing and Equipment:** Standard work clothing is sufficient with good practices. Clothing contaminated with this product should be removed and laundered before reuse. Items which can not be laundered should be discarded. Allow contaminated items to air dry or hang in a well ventilated area. Spontaneous combustion or fire may result from contaminated materials being placed together before drying. Shower and eyewash facilities should be accessible.

#### **Special Work Practices:**

- (1) Wear impervious gloves such as nitrile gloves when "dip-sticking storage tanks"
- (2) Work up-wind of small spills during clean-up
- (3) **DO NOT USE THIS PRODUCT** as a solvent for cleaning equipment or skin
- (4) Store small quantities **ONLY** in "SAFETY CANS" approved for gasoline storage and labeled "GASOLINE"
- (5) Allow contaminated rags to completely dry in a well ventilated area before storage

#### **Exposure Monitoring**

**Biological:** No applicable procedure, breath analysis for hydrocarbons has been suggested. Below are biological monitoring procedures for certain ingredients:

ANALYTE	DETERMINANT	SAMPLING TIME	BIOLOGICAL EXPOSURE INDEX (BEI)
Benzene	S-phenylmercapturic acid in urine	End of shift	25 ug/g creatinine
Toluene	Hippuric acid in urine	End of shift	1.6 g/g creatinine
	Toluene in venous blood	Prior to last shift of week	0.05 mg/L
n-Hexane	2,5-Hexanedione in urine	End of shift	5 mg/g creatinine
	n-Hexane in exhaled air		Semiquantitative
Ethylbenzene	Mandelic acid in urine	End of last shift of week	1.5 g/g creatinine
	Ethylbenzene in exhaled air		Semiquantitative
Xylene	Methylhippuric acid in urine	End of shift	1.5 g/g creatinine

**Personal/Area:** Both active and passive air monitoring utilizing activated charcoal absorption followed by gas chromatography are recommended. A molecular weight of 72.5 has been suggested as the average value to convert total hydrocarbon results from milligrams per cubic meter to ppm. Direct reading indicating tubes are available to evaluate short term exposure.

### **9. Physical and Chemical Properties**

**Appearance and Odor:** Clear, pink, or blue tinted liquid with characteristic, pungent odor; odor threshold is 0.25 ppm and is not an index of exposure.

**Boiling Range @ 760 mm Hg:** 80-437 degrees F

**Melting Point:** NA

**Vapor Density (Air=1):** 3.0-4.0

**Evaporation Rate (BuAc=1):** N/A

**Specific Gravity (H<sub>2</sub>O=1):** 0.68-0.76 @60 degrees F  
**Bulk Density At 60 degrees F:** 5.7-6.3 lbs./gal.  
**Solubility in H<sub>2</sub>O % by WT.:** Trace  
**Reid Vapor Pressure:** 6.8-15 PSI  
**% Volatiles By Vol.:** ~100  
**API Gravity:** 50-75  
**pH:** NA  
**Ron:** 89-98

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**MSDS**Definition  
of terms**Material Safety Data Sheet for Gasoline****10. Stability and Reactivity Information**

**Conditions Contributing to Instability:** Under normal conditions, the material is stable.

**Incompatibility:** Avoid contact with oxidizers and sources of ignition.

**Hazardous Decomposition Products:** Carbon dioxide, carbon monoxide.

**Hazardous Polymerization:** None

**11. Toxicological Information**

For detailed information, contact MSDS Assistance at (210) 592-4593

**12. Ecological Information**

For detailed information, contact MSDS Assistance at (210) 592-4593

**13. Disposal Considerations**

Shipment, storage, disposal, and cleanup actions of waste materials are regulated under local, state and federal rules. Contact the appropriate agencies if uncertain of applicability. Waste product and contaminated material having a flash point below 140 degrees F is considered a hazardous waste. DOT Hazardous Waste Number D001 applies. Consult 40 CFR 262 for EPA disposal requirements.

**14. Transport Information**

DOT Proper Shipping Name	Gasoline
DOT Hazard Class*	3
DOT Packing Group (PG)	II
I.D. Number	UN 1203
Required Labeling	Flammable Liquid

**15. Regulatory Information****TSCA (Toxic Substance Control Act) Inventory**

Gasoline is listed in the TSCA inventory.

**SARA (Superfund Amendments and Reauthorization Act) TITLE III**

This product is reportable under SARA Title III, Sections 311 & 312 as a hazardous

substance.

**Hazard Categories Applicable under 40 DFR 370.2 (SARA Section 311):**

Acute Health	Chronic Health	Pressure	Fire	Reactive
Yes	Yes	No	Yes	No

**Components Listed under 40 CFR 372.2 (SARA Section 311):**

This product does not contain chemicals identified as toxic by EPA under CFR part 372 and is not subject to the reporting requirements of this section. The chemicals contained are:

Component	CAS Number	Percentage
n-Hexane	110-54-31	<6
Cyclohexane	142-82-5	<2
Methyl-t-butyl ether	1634-04-4	<15
Benzene	71-43-2	<3.5
Toluene	100-88-3	<13
Ethylbenzene	100-41-4	<2
o-Xylene	95-47-6	<4
m-Xylene	108-38-3	<4
p-Xylene	106-42-3	<4
Xylene (Mixed Isomers)	1330-20-7	Total <12
1,2,4-Trimethylbenzene	95-63-6	<5

**State Regulations:**

**California Proposition 65:** This product contains chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm. These chemicals are: Benzene (cancer), toluene (reproductive effects).

**16. Other Information**

**NFPA (National Fire Protection Association) Hazard Ratings Codes\***

Fire	Health	Reactivity	Other
3	1	0	Blank

\*Based on Standard System for the Identification of the Fire Hazards of Materials, NFPA No. 704 M

This material safety data sheet was prepared by T. W. Brown Oil Co., Inc. in

accordance with 29 CFR 1910.1200. All information, recommendations and suggestions appearing herein concerning this product are based upon tests and data believed to be reliable, however, it is the user's responsibility to determine the safety, toxicity and suitability for his own use of the product described herein. Since the actual use by others is beyond our control, no guarantee expressed or implied is made by T. W. Brown Oil Co., Inc. as to the effects of such use, the results to be obtained or the safety and toxicity of the product nor does T. W. Brown Oil Co., Inc. assume any liability arising out of use by others of the product referred to herein. Nor is the information herein to be construed as absolutely complete since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.

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Containing One or More of the Following Components in a Nitrogen Balance Gas:  
Carbon Monoxide, 0.0005-1.0%; Hydrogen, 0-2.0%; Methane, 0-2.5%; Oxygen, 0-23.5%

SYNONYMS: Not Applicable

CHEMICAL FAMILY NAME: Not Applicable

FORMULA: Not Applicable

Document Number: 50009

Note: The Material Safety Data Sheet is for this gas mixture supplied in cylinders with 33 cubic feet (935 liters) or less gas capacity (DOT - 39 cylinders). This MSDS has been developed for various gas mixtures with the composition of components within the ranges listed in Section 2 (Composition and Information on Ingredients). Refer to the product label for information on the actual composition of the product.

PRODUCT USE:	Calibration of Monitoring and Research Equipment
SUPPLIER/MANUFACTURER'S NAME:	CALGAZ, LLC
ADDRESS:	821 Chesapeake Drive Cambridge, MD 21613
EMERGENCY PHONE:	CHEMTREC: 1-800-424-9300
BUSINESS PHONE:	1-410-228-6400
General MSDS Information:	1-713-868-0440
Fax on Demand:	1-800-231-1366

## 2. COMPOSITION and INFORMATION ON INGREDIENTS

CHEMICAL NAME	CAS #	mole %	EXPOSURE LIMITS IN AIR					
			ACGIH-TLV		OSHA-PEL		NIOSH IDLH	OTHER
			TWA ppm	STEL ppm	PEL ppm	STEL ppm		
Carbon Monoxide	630-08-0	0.0005-1.0%	25	NE	50 35 (Vacated 1989 PEL)	200 [ceiling] (Vacated 1989 PEL)	1200	NIOSH RELs: TWA = 35 STEL = 200 ceiling DFG MAKs: TWA = 30 PEAK = 2•MAK, 15 min., average value, 1 hr interval DFG MAK Pregnancy Risk Classification: B
Hydrogen	1333-74-0	0-2.0%	There are no specific exposure limits for Hydrogen. Hydrogen is a simple asphyxiant (SA). Oxygen levels should be maintained above 19.5%.					
Methane	74-82-8	0-2.5%	There are no specific exposure limits for Methane. Methane is a simple asphyxiant (SA). Oxygen levels should be maintained above 19.5%.					
Oxygen	7782-44-7	0-23.5%	There are no specific exposure limits for Oxygen. Oxygen levels should be maintained above 19.5%.					
Nitrogen	7727-37-9	Balance	There are no specific exposure limits for Nitrogen. Nitrogen is a simple asphyxiant (SA). Oxygen levels should be maintained above 19.5%.					

NE = Not Established.

See Section 16 for Definitions of Terms Used.

NOTE (1): ALL WHMIS required information is included in appropriate sections based on the ANSI Z400.1-1998 format. This product has been classified in accordance with the hazard criteria of the CPR and the MSDS contains all the information required by the CPR.

## 3. HAZARD IDENTIFICATION

**EMERGENCY OVERVIEW:** This product is a colorless, odorless gas. Carbon Monoxide, a component of this gas mixture, is a chemical asphyxiant and can produce significant, adverse health effects at relatively low concentrations. Over-exposure to Carbon Monoxide can cause nausea, dizziness, headaches, and collapse. Additionally, releases of this product may produce oxygen-deficient atmospheres (especially in small confined spaces or other poorly-ventilated environments); individuals in such atmospheres may be asphyxiated.

**SYMPTOMS OF OVER-EXPOSURE BY ROUTE OF EXPOSURE:** The most significant route of over-exposure for this product is by inhalation.

**INHALATION:** Due to the small size of an individual cylinder of this product, no unusual health effects from over-exposure to the product are anticipated under routine circumstances of use. Inhalation over-exposures to atmospheres containing more than the Threshold Limit Value of Carbon Monoxide (25 ppm) can result in serious health consequences. Carbon Monoxide is classified as a chemical asphyxiant, producing a toxic action by combining with the hemoglobin of the blood and replacing the available oxygen. Through this replacement, the body is deprived of the required oxygen, and asphyxiation occurs.

Since the affinity of carbon monoxide for hemoglobin is about 200-300 times that of oxygen, only a small amount of Carbon Monoxide will cause a toxic reaction to occur. Carbon Monoxide exposures in excess of 50 ppm will produce symptoms of poisoning if breathed for a sufficiently long time. If this product is released in a small, poorly ventilated area (i.e. an enclosed or confined space), symptoms which may develop include the following:

### CONCENTRATION OF CARBON MONOXIDE

### OBSERVED EFFECT

All exposure levels:

Over-exposure to Carbon Monoxide can be indicated by the lips and fingernails turning bright red.

200 ppm:

Slight symptoms (headache, discomfort) after several hours of exposure.

400 ppm:

Headache and discomfort experienced within 2-3 hours of exposure.

### HAZARDOUS MATERIAL IDENTIFICATION SYSTEM

#### HEALTH HAZARD

(BLUE)

2

#### FLAMMABILITY HAZARD

(RED)

0

#### PHYSICAL HAZARD

(YELLOW)

0

#### PROTECTIVE EQUIPMENT

EYES RESPIRATORY HANDS BODY

See Section 8

For Routine Industrial Use and Handling Applications

studies indicate that there is a relationship between exposure to Carbon Monoxide in specific occupations (i.e. firefighters, laundry workers) and an increased incidence of cardiovascular problems. Carbon Monoxide is a reproductive toxin. Refer to Section 11 (Toxicological Information) of this MSDS for further information.

**TARGET ORGANS:** ACUTE: Respiratory system, blood system. **CHRONIC:** Heart, cardiovascular system, central nervous system, reproductive system.

## 4. FIRST-AID MEASURES

**RESCUERS SHOULD NOT ATTEMPT TO RETRIEVE VICTIMS OF OVER-EXPOSURE TO THIS PRODUCT WITHOUT ADEQUATE PERSONAL PROTECTIVE EQUIPMENT.** At a minimum, Self-Contained Breathing Apparatus and Fire-Retardant Personal Protective equipment should be worn. Adequate fire protection must be provided during rescue situations. Victim(s) must be taken for medical attention. Rescuers should be taken for medical attention, if necessary. Take copy of label and MSDS to physician or other health professional with victim(s).

No unusual health effects are anticipated after exposure to this product, due to the small cylinder size. If any adverse symptom develops after over-exposure to this product, remove victim(s) to fresh air, as quickly as possible. Only Trained personnel should administer supplemental oxygen and/or cardio-pulmonary resuscitation, if necessary. Only trained personnel should administer supplemental oxygen.

**MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE:** Pre-existing respiratory conditions may be aggravated by over-exposure to this product. The Carbon Monoxide component of this gas mixture can aggravate some diseases of the cardiovascular system, such as coronary artery disease and angina pectoris.

**RECOMMENDATIONS TO PHYSICIANS:** Treat symptoms and reduce over-exposure. Provide oxygen. Hyperbaric oxygen is the most efficient antidote to Carbon Monoxide poisoning, the optimum range being 2-2.5 atm. A special mask, or, preferably, a compression chamber to utilize oxygen at these pressures is required. Avoid administering stimulant drugs.

## 5. FIRE-FIGHTING MEASURES

**FLASH POINT:** Not applicable.

**AUTOIGNITION TEMPERATURE:** Not applicable.

**FLAMMABLE LIMITS (in air by volume, %):**

Lower (LEL): Not applicable.

Upper (UEL): Not applicable.

**FIRE EXTINGUISHING MATERIALS:** Non-flammable gas mixture. Use extinguishing media appropriate for surrounding fire.

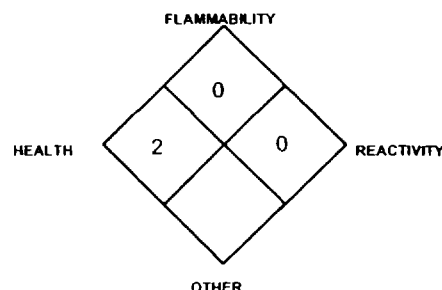
**UNUSUAL FIRE AND EXPLOSION HAZARDS:** This gas mixture is not flammable; however, containers, when involved in fire, may rupture or burst in the heat of the fire.

Explosion Sensitivity to Mechanical Impact: Not Sensitive.

Explosion Sensitivity to Static Discharge: Not Sensitive.

**SPECIAL FIRE-FIGHTING PROCEDURES:** Structural firefighters must wear Self-Contained Breathing Apparatus and full protective equipment.

### NFPA RATING



## 6. ACCIDENTAL RELEASE MEASURES

**LEAK RESPONSE:** Due to the small size and content of the cylinder, an accidental release of this product presents significantly less risk of an oxygen deficient environment and other safety hazards than a similar release from a larger cylinder. However, as with any chemical release, extreme caution must be used during emergency response procedures. In the event of a release in which the atmosphere is unknown, and in which other chemicals are potentially involved, evacuate immediate area. Such releases should be responded to by trained personnel using pre-planned procedures. Proper protective equipment should be used. In case of a leak, clear the affected area, protect people, and respond with trained personnel.

For emergency disposal, secure the cylinder and slowly discharge the gas to the atmosphere in a well-ventilated area or outdoors. Allow the gas mixture to dissipate. If necessary, monitor the surrounding area (and the original area of the release) for oxygen and Carbon Monoxide. Carbon Monoxide level must be below exposure level listed in Section 2 (Composition and Information on Ingredients) before non-emergency personnel are allowed to re-enter area.

*If leaking incidentally from the cylinder or its valve, contact your supplier.*

## 7. HANDLING and USE

**WORK PRACTICES AND HYGIENE PRACTICES:** Be aware of any signs of dizziness or fatigue; exposures to fatal concentrations of this product could occur without any significant warning symptoms, due to oxygen deficiency. Do not attempt to repair, adjust, or in any other way modify the cylinders containing Carbon Monoxide. If there is a malfunction or another type of operational problem, contact nearest distributor immediately.

**STORAGE AND HANDLING PRACTICES:** Cylinders should be firmly secured to prevent falling or being knocked-over. Cylinders must be protected from the environment, and preferably kept at room temperature (approximately 21°C, 70°F). Cylinders should be stored in dry, well-ventilated areas, away from sources of heat, ignition, and direct sunlight. Protect cylinders against physical damage. Full and empty cylinders should be segregated. Use a first-in, first-out inventory system to prevent full containers from being stored for long periods of time. These cylinders are not refillable. **WARNING! Do not refill DOT 39 cylinders. To do so may cause personal injury or property damage.**

**SPECIAL PRECAUTIONS FOR HANDLING GAS CYLINDERS: WARNING!** Compressed gases can present significant safety hazards. During cylinder use, use equipment designed for these specific cylinders. Ensure all lines and equipment are rated for proper service pressure.

**PROTECTIVE PRACTICES DURING MAINTENANCE OF CONTAMINATED EQUIPMENT:** Follow practices indicated in Section 6 (Accidental Release Measures). Make certain that application equipment is locked and tagged-out safely. Always use product in areas where adequate ventilation is provided.

## 8. EXPOSURE CONTROLS - PERSONAL PROTECTION

**VENTILATION AND ENGINEERING CONTROLS:** No special ventilation systems or engineering controls are needed under normal circumstances of use. As with all chemicals, use this product in well-ventilated areas. If this product is used in a poorly-ventilated area, install automatic monitoring equipment to detect the levels of Carbon Monoxide and oxygen.

**RESPIRATORY PROTECTION:** No special respiratory protection is required under normal circumstances of use. Use supplied air respiratory protection if Oxygen levels are below 19.5%, or unknown, during emergency response to a release of this product. If respiratory protection is needed, use only protection authorized in the U.S. Federal OSHA Standard (29 CFR 1910.134), applicable U.S. State regulations, or the Canadian CSA Standard Z94.4-93 and applicable standards of Canadian Provinces. Oxygen levels below 19.16.33% are considered IDLH by OSHA. In such atmospheres, use of a full-facepiece pressure/demand SCBA or a full facepiece, supplied air respirator with auxiliary self-contained air supply is required under OSHA's Respiratory Protection Standard (1910.134-1998). In the event that exposure limits may be exceeded for Carbon

pressure-demand or other positive-pressure mode, or any SAR that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary SCBA operated in pressure-demand or other positive-pressure mode.

**Escape:** Any Air-Purifying, Full-Facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against Carbon Monoxide, or any appropriate escape-type, SCBA.

**EYE PROTECTION:** Safety glasses. If necessary, refer to U.S. OSHA 29 CFR 1910.133 or appropriate Canadian Standards.

**HAND PROTECTION:** No special protection is needed under normal circumstances of use. If necessary, refer to U.S. OSHA 29 CFR 1910.138 or appropriate Standards of Canada.

**BODY PROTECTION:** No special protection is needed under normal circumstances of use. If a hazard of injury to the feet exists due to falling objects, rolling objects, where objects may pierce the soles of the feet or where employee's feet may be exposed to electrical hazards, use foot protection, as described in U.S. OSHA 29 CFR 1910.136.

## 9. PHYSICAL and CHEMICAL PROPERTIES

The following physical property values are for the main component, Nitrogen:

**GAS DENSITY @ 32°F (0°C) and 1 atm:** .072 lbs/ ft<sup>3</sup> (1.153 kg/m<sup>3</sup>)

**BOILING POINT:** -320.4°F (-195.8°C)

**FREEZING/MELTING POINT @ 10 psig** -210°C (-345.8°F)

**SPECIFIC GRAVITY (air = 1) @ 70°F (21.1°C):** 0.906

**SOLUBILITY IN WATER vol/vol @ 32°F (0°C) and 1 atm:** 0.023

**EVAPORATION RATE (nBuAc = 1):** Not applicable.

**ODOR THRESHOLD:** Not applicable. Odorless.

**VAPOR PRESSURE @ 70°F (21.1°C) psig:** Not applicable.

**COEFFICIENT WATER/OIL DISTRIBUTION:** Not applicable.

**pH:** Not applicable.

**MOLECULAR WEIGHT:** 28.01

**EXPANSION RATIO:** Not applicable.

**SPECIFIC VOLUME (ft<sup>3</sup>/lb):** 13.8

The following values are for the gas mixture:

**APPEARANCE, ODOR AND COLOR:** This product is a colorless, odorless gas mixture.

**HOW TO DETECT THIS SUBSTANCE (warning properties):** There are no unusual warning properties associated with a release of this product.

## 10. STABILITY and REACTIVITY

**STABILITY:** Stable at normal temperature and pressure.

**DECOMPOSITION PRODUCTS:** The thermal decomposition products of Methane include carbon oxides. The other components of this gas mixture do not decompose, per se, but can react with other compounds in the heat of a fire.

**MATERIALS WITH WHICH SUBSTANCE IS INCOMPATIBLE:** Titanium will burn in Nitrogen (the main component of this product). Lithium reacts slowly with Nitrogen at ambient temperatures. Components of this product (Hydrogen, Carbon Monoxide, Methane) are also incompatible with strong oxidizers (i.e. chlorine, bromine pentafluoride, oxygen, oxygen difluoride, and nitrogen trifluoride). Carbon Monoxide is mildly corrosive to nickel and iron (especially at high temperatures and pressures).

**HAZARDOUS POLYMERIZATION:** Will not occur.

**CONDITIONS TO AVOID:** Contact with incompatible materials. Cylinders exposed to high temperatures or direct flame can rupture or burst.

## 11. TOXICOLOGICAL INFORMATION

**TOXICITY DATA:** The following toxicology data are available for the components of this product:

### CARBON MONOXIDE:

LC<sub>50</sub> (Inhalation-Rat) 1807 ppm/4 hours  
LC<sub>50</sub> (Inhalation-Mouse) 2444 ppm/4 hours  
LC<sub>50</sub> (Inhalation-Guinea Pig) 5718 ppm/4 hours  
LC<sub>50</sub> (Inhalation-wild bird species) 1334 ppm  
LCLo (Inhalation-Human) 4 mg/m<sup>3</sup>/12 hours:  
Behavioral: coma; Vascular: BP lowering not characterized in autonomic section; Blood: methemoglobinemia-carboxyhemoglobin  
LCLo (Inhalation-Man) 4000 ppm/30 minutes  
LCLo (Inhalation-Human) 5000 ppm/5 minutes  
LCLo (Inhalation-Dog) 4000 ppm/46 minutes  
LCLo (Inhalation-Rabbit) 4000 ppm  
LCLo (Inhalation-Mammal-species unspecified)

5000 ppm/5 minutes  
TCLo (Inhalation-Human) 600 mg/m<sup>3</sup>/10 minutes: Behavioral: headache  
TCLo (Inhalation-Man) 650 ppm/45 minutes: Blood: methemoglobinemia-carboxyhemoglobin; Behavioral: changes in psychophysiological tests  
TCLo (Inhalation-Rat) 1800 ppm/1 hour/14 days-intermittent: Cardiac: other changes  
TCLo (Inhalation-Rat) 30 mg/m<sup>3</sup>/8 hours/10 weeks-intermittent: Brain and Coverings: other degenerative changes;  
Behavioral: muscle contraction or spasticity  
TCLo (Inhalation-Rat) 96 ppm/24 hours/90 days-continuous: Blood: pigmented or

nucleated red blood cells, other changes  
TCLo (Inhalation-Rat) 250 ppm/5 hours/20 days-intermittent: Blood: pigmented or nucleated red blood cells, changes in other cell count (unspecified), changes in erythrocyte (RBC) count  
TDLo (Subcutaneous-Rat) 5983 mg/kg/18 weeks-intermittent: Blood: changes in serum composition (e.g. TP, bilirubin, cholesterol)  
TCLo (Inhalation-Mouse) 50 ppm/30 days-intermittent: Lungs, Thorax, or Respiration: structural or functional change in trachea or bronchi

TCLo (Inhalation-Monkey) 200 ppm/24 hours/90 days-continuous: Blood: pigmented or nucleated red blood cells, other changes  
TCLo (Inhalation-Rabbit) 200 mg/m<sup>3</sup>/3 hours/13 weeks-intermittent: Brain and Coverings: other degenerative changes; Cardiac: other changes; Blood: hemorrhage  
TCLo (Inhalation-Rabbit) 50 ppm/24 hours/8 weeks-continuous: Blood: changes in platelet count  
TCLo (Inhalation-Guinea Pig) 200 mg/m<sup>3</sup>/5 hours/4 weeks-intermittent: Endocrine: hyperglycemia  
TCLo (Inhalation-Guinea Pig) 200 mg/m<sup>3</sup>/5 hours/30 weeks-continuous: Cardiac: arrhythmias (including changes in conduction),  
EKG changes not diagnostic of specified effects, pulse rate increase, without fall in BP  
TCLo (Inhalation-Guinea Pig) 200 ppm/24 hours/90 days-continuous: Blood: pigmented or nucleated red blood cells, other changes  
TCLo (Inhalation-Rat) 75 ppm/24 hours: female 0-20 day(s) after conception: Reproductive: Maternal Effects: other effects; Effects on Newborn: behavioral  
TCLo (Inhalation-Rat) 150 ppm/24 hours: female 1-22 day(s) after conception: Reproductive: Specific Developmental

Abnormalities: cardiovascular (circulatory) system  
TCLo (Inhalation-Rat) 150 ppm/24 hours: female 1-22 day(s) after conception: Reproductive: Effects on Newborn: growth statistics (e.g.%, reduced weight gain), behavioral  
TCLo (Inhalation-Rat) 1 mg/m<sup>3</sup>/24 hours: female 72 day(s) pre-mating: Reproductive: Maternal Effects: menstrual cycle changes or disorders, parturition; Fertility: female fertility index (e.g. # females pregnant per # sperm positive females; # females pregnant per # females mated)  
TCLo (Inhalation-Rat) 150 ppm/24 hours: female 0-20 day(s) after conception: Reproductive: Effects on Newborn: behavioral  
TCLo (Inhalation-Rat) 75 ppm/24 hours: female 0-20 day(s) after conception: Reproductive: Specific Developmental Abnormalities: immune and reticuloendothelial system  
TCLo (Inhalation-Mouse) 65 ppm/24 hours: female 7-18 day(s) after conception: Reproductive: Effects on Newborn: behavioral  
TCLo (Inhalation-Mouse) 250 ppm/7 hours: female 6-15 day(s) after conception: Reproductive: Fertility: post-implantation

mortality (e.g. dead and/or resorbed implants per total number of implants); Specific Developmental Abnormalities: musculoskeletal system  
TCLo (Inhalation-Mouse) 125 ppm/24 hours: female 7-18 day(s) after conception: Reproductive: Effects on Embryo or Fetus: fetotoxicity (except death, e.g., stunted fetus)  
TCLo (Inhalation-Mouse) 8 ppm/1 hour: female 8 day(s) after conception: Reproductive: Fertility: litter size (e.g. # fetuses per litter; measured before birth); Effects on Embryo or Fetus: fetotoxicity (except death, e.g., stunted fetus), fetal death  
TCLo (Inhalation-Mouse) 8 ppm/1 hour: female 8 day(s) after conception: Reproductive: Specific Developmental Abnormalities: Central Nervous System  
TCLo (Inhalation-Rabbit) 180 ppm/24 hours: female 1-30 day(s) after conception: Reproductive: Effects on Newborn: stillbirth, viability index (e.g., # alive at day 4 per # born alive)  
Micronucleus Test (Inhalation-Mouse) 1500 ppm/10 minutes  
Sister Chromatid Exchange (Inhalation-Mouse) 2500 ppm/10 minutes

reproductive system.

**Mutagenicity:** The components of this gas mixture are not reported to cause mutagenic effects in humans.

**Embryotoxicity:** The components of this gas mixture are not reported to cause embryotoxic effects in humans.

**Teratogenicity:** This gas mixture is not expected to cause teratogenic effects in humans due to the small cylinder size and small total amount of all components. The Carbon Monoxide component of this gas mixture, which exists up to 1%, can cause teratogenic effects in humans. Severe exposure to Carbon Monoxide during pregnancy has caused adverse effects and the death of the fetus. In general, maternal symptoms are an indicator of the potential risk to the fetus since Carbon Monoxide is toxic to the mother before it is toxic to the fetus.

**Reproductive Toxicity:** The components of this gas mixture are not reported cause adverse reproductive effects in humans.

*A **mutagen** is a chemical which causes permanent changes to genetic material (DNA) such that the changes will propagate through generation lines. An **embryotoxin** is a chemical which causes damage to a developing embryo (i.e. within the first eight weeks of pregnancy in humans), but the damage does not propagate across generational lines. A **teratogen** is a chemical which causes damage to a developing fetus, but the damage does not propagate across generational lines. A **reproductive toxin** is any substance which interferes in any way with the reproductive process.*

**BIOLOGICAL EXPOSURE INDICES (BEIs):** Biological Exposure Indices (BEIs) have been determined for the Carbon Monoxide component, as follows:

CHEMICAL DETERMINANT	SAMPLING TIME	BEI
CARBON MONOXIDE • Carboxyhemoglobin in blood • Carbon monoxide in end-exhaled air	• End of shift • End of shift	• 3.5% of hemoglobin • 20 ppm

## 12. ECOLOGICAL INFORMATION

**ENVIRONMENTAL STABILITY:** The components of this gas mixture occur naturally in the atmosphere. The gas will be dissipated rapidly in well-ventilated areas.

**EFFECT OF MATERIAL ON PLANTS or ANIMALS:** No evidence is currently available on the effects of this gas mixture on plant and animal life. The Carbon Monoxide component of this gas mixture can be deadly to exposed animal life, producing symptoms similar to those experienced by humans. Carbon Monoxide may also be harmful to plant life.

**EFFECT OF CHEMICAL ON AQUATIC LIFE:** No evidence is currently available on this product's effects on aquatic life. The presence of more than a trace of the Carbon Monoxide component of this product is a hazard to fish.

## 13. DISPOSAL CONSIDERATIONS

**PREPARING WASTES FOR DISPOSAL PREPARING WASTES FOR DISPOSAL:** Waste disposal must be in accordance with appropriate U.S. Federal, State, and local regulations and those of Canada and its Provinces. Cylinders with undesired residual product may be safely vented outdoors with the proper regulator. For further information, refer to Section 16 (Other Information)

## 14. TRANSPORTATION INFORMATION

**THIS GAS MIXTURE IS HAZARDOUS AS DEFINED BY 49 CFR 172.101 BY THE U.S. DEPARTMENT OF TRANSPORTATION.**

**PROPER SHIPPING NAME:** Compressed gases, n.o.s. ("Oxygen, Nitrogen") or the gas component with the next highest concentration next to Nitrogen.

**HAZARD CLASS NUMBER and DESCRIPTION:** 2.2 (Non-Flammable Gas)

**UN IDENTIFICATION NUMBER:** UN 1956

**PACKING GROUP:** Not applicable.

**DOT LABEL(S) REQUIRED:** Class 2.2 (Non-Flammable Gas)

**NORTH AMERICAN EMERGENCY RESPONSE GUIDEBOOK NUMBER (2000):** 126

**MARINE POLLUTANT:** The components of this gas mixture are not classified by the DOT as Marine Pollutants (as defined by 49 CFR 172.101, Appendix B)

**SPECIAL SHIPPING INFORMATION:** Cylinders should be transported in a secure position, in a well-ventilated vehicle. The transportation of compressed gas cylinders in automobiles or in closed-body vehicles can present serious safety hazards. If transporting these cylinders in vehicles, ensure these cylinders are not exposed to extremely high temperatures (as may occur in an enclosed vehicle on a hot day). Additionally, the vehicle should be well-ventilated during transportation.

**Note:** DOT 39 Cylinders ship in a strong outer carton (overpack). Pertinent shipping information goes on the outside of the overpack. DOT 39 Cylinders do not have transportation information on the cylinder itself.

**TRANSPORT CANADA TRANSPORTATION OF DANGEROUS GOODS REGULATIONS:** This gas mixture is considered as Dangerous Goods, per regulations of Transport Canada.

**PROPER SHIPPING NAME:** Compressed gases, n.o.s. ("Oxygen, Nitrogen") or the gas component with the next highest concentration next to Nitrogen.

**HAZARD CLASS NUMBER and DESCRIPTION:** 2.2 (Non-Flammable Gas)

**UN IDENTIFICATION NUMBER:** UN 1956

**PACKING GROUP:** Not Applicable

**HAZARD LABEL:** Class 2.2 (Non-Flammable Gas)

**SPECIAL PROVISIONS:** None

**EXPLOSIVE LIMIT AND LIMITED QUANTITY INDEX:** 0.12

**ERAP INDEX:** None

**PASSENGER CARRYING SHIP INDEX:** None

**PASSENGER CARRYING ROAD VEHICLE OR PASSENGER CARRYING RAILWAY VEHICLE INDEX:** 75

**NORTH AMERICAN EMERGENCY RESPONSE GUIDEBOOK NUMBER (2000):** 126

**NOTE:** Shipment of compressed gas cylinders via Public Passenger Road Vehicle is a violation of Canadian law (Transport Canada Transportation of Dangerous Goods Act, 1992)

## 15. REGULATORY INFORMATION

**ADDITIONAL U.S. REGULATIONS:**

**U.S. SARA REPORTING REQUIREMENTS:** The components of this gas mixture are not subject to the reporting requirements of Sections 302, 304 and 313 of Title III of the Superfund Amendments and Reauthorization Act., as follows:

**U.S. SARA THRESHOLD PLANNING QUANTITY:** There are no specific Threshold Planning Quantities for the components of

Limit for Chemical Contaminants:  
Carbon Monoxide, Nitrogen, Methane,  
Hydrogen.

Florida - Substance List: Oxygen,  
Carbon Monoxide, Hydrogen.

Illinois - Toxic Substance List: Carbon  
Monoxide, Hydrogen.

Kansas - Section 302/313 List: No.

Massachusetts - Substance List:  
Oxygen, Carbon Monoxide, Methane,  
Hydrogen.

Methane, Hydrogen.

Missouri - Employer Information/Toxic  
Substance List: Methane, Hydrogen

New Jersey - Right to Know Hazardous  
Substance List: Oxygen, Carbon  
Monoxide, Nitrogen, Methane,  
Hydrogen.

North Dakota - List of Hazardous  
Chemicals, Reportable Quantities:  
No.

Limit: Oxygen, Carbon Monoxide,  
Nitrogen, Methane, Hydrogen.

Texas - Hazardous Substance List: No.

West Virginia - Hazardous Substance  
List: No.

Wisconsin - Toxic and Hazardous  
Substances: No.

**CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65):** Carbon Monoxide is on the California Proposition 65 lists. **WARNING:** This gas mixture contains a chemical known to the State of California to cause birth defects or other reproductive harm.

#### **OTHER U.S. FEDERAL REGULATIONS:**

- Carbon Monoxide is subject to the reporting requirements of CFR 29 1910.1000. Carbon Monoxide is listed on Table Z.1.
- Hydrogen and Methane are subject to the reporting requirements of Section 112(r) of the Clean Air Act. The Threshold Quantity for each of these gases is 10,000 pounds and so this mixture will not be affected by the regulation.
- This gas mixture does not contain any Class I or Class II ozone depleting chemicals (40 CFR part 82).
- Nitrogen and Oxygen are not listed as Regulated Substances, per 40 CFR, Part 68, of the Risk Management for Chemical Releases. Carbon Monoxide, Methane, and Hydrogen are listed under this regulation in Table 3 as Regulated Substances (Flammable Substances), in quantities of 10,000 lbs (4,553 kg) or greater, and so this mixture will not be affected by the regulation.

#### **ADDITIONAL CANADIAN REGULATIONS:**

**CANADIAN DSL/NDL INVENTORY STATUS:** The components of this gas mixture are on the DSL Inventory.

**CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) PRIORITIES SUBSTANCES LISTS:** The components of this gas mixture are not on the CEPA Priorities Substances Lists.

**OTHER CANADIAN REGULATIONS:** This gas mixture is categorized as a Controlled Product, Hazard Classes A and D2A, as per the Controlled Product Regulations.

## **16. OTHER INFORMATION**

### **INFORMATION ABOUT DOT-39 NRC (Non-Refillable Cylinder) PRODUCTS**

DOT 39 cylinders ship as hazardous materials when full. Once the cylinders are relieved of pressure (empty) they are not considered hazardous material or waste. Residual gas in this type of cylinder is not an issue because toxic gas mixtures are prohibited. Calibration gas mixtures typically packaged in these cylinders are Nonflammable n.o.s., UN 1956. A small percentage of calibration gases packaged in DOT 39 cylinders are flammable or oxidizing gas mixtures.

For disposal of used DOT-39 cylinders, it is acceptable to place them in a landfill if local laws permit. Their disposal is no different than that employed with other DOT containers such as spray paint cans, household aerosols, or disposable cylinders of propane (for camping, torch etc.). When feasible, we recommended recycling for scrap metal content. CALGAZ, LLC will do this for any customer that wishes to return cylinders to us prepaid. All that is required is a phone call to make arrangements so we may anticipate arrival. Scrapping cylinders involves some preparation before the metal dealer may accept them. We perform this operation as a service to valued customers who want to participate.

**MIXTURES:** When two or more gases or liquefied gases are mixed, their hazardous properties may combine to create additional, unexpected hazards. Obtain and evaluate the safety information for each component before you produce the mixture. Consult an Industrial Hygienist or other trained person when you make your safety evaluation of the end product. Remember, gases and liquids have properties which can cause serious injury or death.

Further information about the handling of compressed gases can be found in the following pamphlets published by: Compressed Gas Association Inc. (CGA), 1725 Jefferson Davis Highway, Suite 1004, Arlington, VA 22202-4102. Telephone: (703) 412-0900.

P-1 "Safe Handling of Compressed Gases in Containers"

AV-1 "Safe Handling and Storage of Compressed Gases"

"Handbook of Compressed Gases"

#### **PREPARED BY:**

CHEMICAL SAFETY ASSOCIATES, Inc.  
PO Box 3519, La Mesa, CA 91944-3519  
619/670-0609

Fax on Demand: 1-800/231-1366



**AIR LIQUIDE**

This Material Safety Data Sheet is offered pursuant to OSHA's Hazard Communication Standard, 29 CFR, 1910.1200. Other government regulations must be reviewed for applicability to this product. To the best of CALGAZ, LLC knowledge, the information contained herein is reliable and accurate as of this date; however, accuracy, suitability or completeness are not guaranteed and no warranties of any type, either express or implied, are provided. The information contained herein relates only to this specific product. If this product is combined with other materials, all component properties must be considered. Data may be changed from time to time. Be sure to consult the latest edition.

Linde Gas



Linde Gas LLC (216) 642-6600  
P.O. Box 94737  
Cleveland, Ohio 44101  
www.us.lindegas.com

**MATERIAL  
SAFETY  
DATA SHEET**

No. 002

PRODUCT NAME Compressed Air	CAS # N/A
TRADE NAME AND SYNONYMS Compressed Air; Air; Compressed Air, Breathing Quality	DOT I.D. No.: UN 1002
CHEMICAL NAME AND SYNONYMS Air, compressed (D.O.T.) See Page 4	DOT Hazard Class: Division 2.2
	Formula See page 4
ISSUE DATES AND REVISIONS Revised January 1995	Chemical Family: N/A

**HEALTH HAZARD DATA**

TIME WEIGHTED AVERAGE EXPOSURE LIMIT  No TWA established (ACGIH 1994-1995). No PEL (8 Hr. TWA) listed by OSHA 1993.
SYMPTOMS OF EXPOSURE Air is nontoxic and necessary to support life. Inhalation of air in a high pressure environment such as underwater diving, caissons or hyperbaric chambers can result in symptoms similar to overexposure to pure oxygen. These include tingling of fingers and toes, abnormal sensations, impaired coordination and confusion. Decompression sickness, pains or "bends" are possible following rapid decompression.
TOXICOLOGICAL PROPERTIES High pressure effects (greater than two atmospheres of oxygen) are on the central nervous system. Improper decompression results in the accumulation of nitrogen in the blood.  Air is not listed in the IARC, NTP or by OSHA as a carcinogen or potential carcinogen.  Persons in ill health when such illness would be aggravated by exposure to high pressure air should not be allowed to work with or handle this product.
RECOMMENDED FIRST AID TREATMENT Facilities or practices at which air is breathed in a high pressure environment should be prepared to deal with the illnesses associated with decompression (bends or caisson disease). Decompression equipment may be required.

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Since the Company shall have no control of the use of the product described herein, the Company assumes no liability for loss or damage incurred from the proper or improper use of such product.

**HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES**

N/A

**PHYSICAL DATA**

BOILING POINT -317.8°F (-194.3°C)	LIQUID DENSITY AT BOILING POINT 54.56 lb/ft <sup>3</sup> (874 kg/m <sup>3</sup> )
VAPOR PRESSURE @70°F (21.1°C): Above the critical temp. of -221.1°F (-140.6°F)	GAS DENSITY AT 70°F, 1 atm .0749 lb/ft <sup>3</sup> (1.200 kg/m <sup>3</sup> )
SOLUBILITY IN WATER Very slightly	FREEZING POINT N/A (Gas Mixture)
EVAPORATION RATE N/A Gas	SPECIFIC GRAVITY (AIR=1) @70°F (21.1°C) = 1.0
APPEARANCE AND ODOR Colorless, odorless gas	

**FIRE AND EXPLOSION HAZARD DATA**

FLASH POINT (Method used) N/A	AUTO IGNITION TEMPERATURE N/A	FLAMMABLE LIMITS % BY VOLUME (See Page 4) LEL N/A UEL N/A
EXTINGUISHING MEDIA Nonflammable gas		ELECTRICAL CLASSIFICATION Nonhazardous
SPECIAL FIRE FIGHTING PROCEDURES If cylinders are involved in a fire, safely relocate or keep cool with water spray.		
UNUSUAL FIRE AND EXPLOSION HAZARDS Compressed air at high pressures will accelerate the burning of materials to a greater rate than they burn at atmospheric pressure.		

**REACTIVITY DATA**

STABILITY Unstable		CONDITIONS TO AVOID None
Stable	X	
INCOMPATIBILITY (Materials to avoid) None		
HAZARDOUS DECOMPOSITION PRODUCTS None		
HAZARDOUS POLYMERIZATION May Occur		CONDITIONS TO AVOID None
Will Not Occur	X	

**SPILL OR LEAK PROCEDURES**

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED N/A
WASTE DISPOSAL METHOD N/A

**SPECIAL PROTECTION INFORMATION**

RESPIRATORY PROTECTION (Specify type) N/A		
VENTILATION	LOCAL EXHAUST	SPECIAL
N/A	N/A	N/A
	MECHANICAL (Gen.)	OTHER
	N/A	N/A
PROTECTIVE GLOVES Any material		
EYE PROTECTION Safety goggles or glasses		
OTHER PROTECTIVE EQUIPMENT Safety shoes		

**SPECIAL PRECAUTIONS\***

<b>SPECIAL LABELING INFORMATION</b>		
DOT Shipping Name: Air, Compressed	DOT Hazard Class:	Division 2.2
DOT Shipping Label: Nonflammable Gas	I.D. No.:	UN 1002
<b>SPECIAL HANDLING RECOMMENDATIONS</b>		
<p>Valve protection caps must remain in place unless container is secured with valve outlet piped to use point. Do not drag, slide or roll cylinders. Use a suitable hand truck for cylinder movement. Use a pressure reducing regulator when connecting cylinder to lower pressure (&lt;3,000 psig) piping or systems. Do not heat cylinder by any means to increase the discharge rate of product from the cylinder. Use a check valve or trap in the discharge line to prevent hazardous back flow into the cylinder.</p> <p>For additional handling recommendations, consult the Compressed Gas Association's Pamphlets P-1, G-7, and G-7.1.</p>		
<b>SPECIAL STORAGE RECOMMENDATIONS</b>		
<p>Protect cylinders from physical damage. Store in cool, dry, well-ventilated area away from heavily trafficked areas and emergency exits. Do not allow the temperature where cylinders are stored to exceed 125°F (52°C). Cylinders should be stored upright and firmly secured to prevent falling or being knocked over. Full and empty cylinders should be segregated. Use a "first in - first out" inventory system to prevent full cylinders being stored for excessive periods of time.</p> <p>For additional storage recommendations, consult the Compressed Gas Association's Pamphlets P-1, G-7, and O-7.1.</p>		
<b>SPECIAL PACKAGING RECOMMENDATIONS</b>		
<p>Dry air is noncorrosive and may be used with all materials of construction. Moisture causes metal oxides which are formed with air to be hydrated so that they increase in volume and lose their protective role (rust formation). Concentrations of SO<sub>2</sub>, Cl<sub>2</sub>, salt, etc. in the moisture enhances the rusting of metals in air.</p>		
<b>OTHER RECOMMENDATIONS OR PRECAUTIONS</b>		
<p>Compressed gas cylinders should not be refilled except by qualified producers of compressed gases. Shipment of a compressed gas cylinder which has not been filled by the owner or with his (written) consent is a violation of Federal Law (49CFR).</p>		

(Continued on Page 4)



## Compressed Air

### CHEMICAL FORMULA: (Continued)

Atmospheric air which is compressed is composed of the following concentrations of gases:

<u>Gas</u>	<u>Molar %</u>
Nitrogen	78.09
Oxygen	20.94
Argon	0.93
Carbon Dioxide	0.033*
Neon	$18.18 \times 10^{-4}$
Helium	$5.239 \times 10^{-4}$
Krypton	$1.139 \times 10^{-4}$
Hydrogen	$0.5 \times 10^{-4}$
Xenon	$0.086 \times 10^{-4}$
Radon	$6 \times 10^{-18}$
Water vapor	Varying concentrations

\*Concentrations may have slight variations.

Compressed air is also produced by reconstitution using only oxygen and nitrogen. This product contains 79 molar percent nitrogen and 21 molar percent oxygen plus trace amounts of other atmospheric gases which are present in the oxygen and nitrogen.

### SPECIAL PRECAUTIONS

### OTHER RECOMMENDATIONS OR PRECAUTIONS: (Continued)

Reporting under SARA, Title III, Section 313 not required.

NFPA 704 No. for gaseous air = 0 0 0 None

Linde Gas



Linde Gas LLC (216) 642-6600  
P.O. Box 94737  
Cleveland, Ohio 44101  
www.us.lindegas.com

**MATERIAL  
SAFETY  
DATA SHEET**

No. 012

PRODUCT NAME Isobutylene	CAS # 115-11-7
TRADE NAME AND SYNONYMS Isobutylene, Isobutene, 2-Methylpropene	DOT I.D. No.: UN 1055
CHEMICAL NAME AND SYNONYMS Isobutylene or 2-Methylpropene	DOT Hazard Class: Division 2.1
ISSUE DATES AND REVISIONS Revised January 1995	Formula iso C <sub>4</sub> H <sub>8</sub>
	Chemical Family: Monolefin

**HEALTH HAZARD DATA**

<p><b>TIME WEIGHTED AVERAGE EXPOSURE LIMIT</b> Isobutylene should be considered a simple asphyxiant (ACGIH 1994-1995). No PEL (8 Hr. TWA) is listed by OSHA (1993). (Continued on Page 4)</p>
<p><b>SYMPTOMS OF EXPOSURE</b> Inhalation: Moderate concentrations so as to exclude an adequate supply of oxygen to the lungs causes dizziness, drowsiness and eventual unconsciousness. It also has a very mild anesthetic effect which might cause lack of coordination or lessened mental alertness. (Continued on Page 4)</p>
<p><b>TOXICOLOGICAL PROPERTIES</b> It has a very mild anesthetic effect; however, the major property is the exclusion of an adequate supply of oxygen to the lungs.  Frostbite effects are a change in color of the skin to gray or white possibly followed by blistering.  Isobutylene is not listed in the IARC, NTP or by OSHA as a carcinogen or potential carcinogen. (Continued on Page 4)</p>
<p><b>RECOMMENDED FIRST AID TREATMENT</b> PROMPT MEDICAL ATTENTION IS MANDATORY IN ALL CASES OF OVEREXPOSURE TO ISOBUTYLENE. RESCUE PERSONNEL SHOULD BE EQUIPPED WITH SELF-CONTAINED BREATHING APPARATUS AND BE COGNIZANT OF EXTREME FIRE AND EXPLOSION HAZARD.  Inhalation: Conscious persons should be assisted to an uncontaminated area and inhale fresh air. Quick removal from the contaminated area is most important. Unconscious persons should be moved to an uncontaminated area, given assisted respiration and supplemental oxygen. Further treatment should be symptomatic and supportive. (Continued on page 4)</p>

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Since the Company shall have no control of the use of the product described herein, the Company assumes no liability for loss or damage incurred from the proper or improper use of such product.

**HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES**

Isobutylene is flammable in air.

**PHYSICAL DATA**

BOILING POINT 19.5°F (-6.9°C)	LIQUID DENSITY AT BOILING POINT 39.1 lb/ft <sup>3</sup> (626 kg/m <sup>3</sup> )
VAPOR PRESSURE @ 70°F (21.1°C) 39 psia (269 kPa)	GAS DENSITY AT 70°F, 1 atm 0.148 lb/ft <sup>3</sup> (2.37 kg/m <sup>3</sup> )
SOLUBILITY IN WATER Insoluble	FREEZING POINT -220.6°F (-140.3°C)
EVAPORATION RATE N/A (Gas)	SPECIFIC GRAVITY (AIR=1) @ 70°F (21.1°C) = 1.98
APPEARANCE AND ODOR Colorless gas with an unpleasant odor similar to that which is emitted when burning anthracite coal.	

**FIRE AND EXPLOSION HAZARD DATA**

FLASH POINT (Method used) -105°F (-76°C) C.C.	AUTO IGNITION TEMPERATURE 869°F (465°C)	FLAMMABLE LIMITS % BY VOLUME (See Page 4) LEL 1.8 UEL 9.6
EXTINGUISHING MEDIA Water, carbon dioxide, dry chemical		ELECTRICAL CLASSIFICATION Class 1, Group not specified
SPECIAL FIRE FIGHTING PROCEDURES If possible, stop the flow of isobutylene. Use water spray to cool surrounding containers.		
UNUSUAL FIRE AND EXPLOSION HAZARDS Isobutylene is heavier than air and may travel a considerable distance to a source of ignition. Should flame be extinguished and flow of gas continue, increase ventilation to prevent flammable mixture formation in low areas or pockets.		

**REACTIVITY DATA**

STABILITY Unstable		CONDITIONS TO AVOID None
Stable	X	
INCOMPATIBILITY (Materials to avoid) Oxidizers		
HAZARDOUS DECOMPOSITION PRODUCTS None		
HAZARDOUS POLYMERIZATION May Occur		CONDITIONS TO AVOID None
Will Not Occur	X	

**SPILL OR LEAK PROCEDURES**

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED  Evacuate all personnel from affected area. Use appropriate protective equipment. If leak is in user's equipment, be certain to purge piping with an inert gas prior to attempting repairs. If leak is in container or container valve, contact your closest supplier location or call the emergency telephone number listed herein.
WASTE DISPOSAL METHOD  Do not attempt to dispose of waste or unused quantities. Return in the shipping container <u>properly labeled, with any valve outlet plugs or caps secured and valve protection cap in place</u> to your supplier for proper disposal. For emergency disposal, contact your closest supplier location or call the emergency telephone number listed herein.

**SPECIAL PROTECTION INFORMATION**

<b>RESPIRATORY PROTECTION</b> (Specify type) Positive pressure air line with mask or self-contained breathing apparatus should be available for emergency use. (Continued on Page 4)		
<b>VENTILATION</b>  Hood with forced ventilation	<b>LOCAL EXHAUST</b> To prevent accumulation above the LEL	<b>SPECIAL</b> N/A
	<b>MECHANICAL (Gen.)</b> In accordance with electrical codes	<b>OTHER</b> N/A
<b>PROTECTIVE GLOVES</b> Plastic or Rubber		
<b>EYE PROTECTION</b> Safety goggles or glasses		
<b>OTHER PROTECTIVE EQUIPMENT</b> Safety shoes, safety shower, eyewash "fountain"		

**SPECIAL PRECAUTIONS\***

<b>SPECIAL LABELING INFORMATION</b> DOT Shipping Name: Isobutylene DOT Shipping Label: Flammable gas		DOT Hazard Class: Division 2.1 I.D. No.: UN 1055
<b>SPECIAL HANDLING RECOMMENDATIONS</b> Use only in well-ventilated areas. Valve protection caps must remain in place unless 1 container is secured with valve outlet piped to use point. Do not drag, slide or roll 1 cylinders. Use a suitable hand truck for cylinder movement. Use a pressure reducing regulator when connecting cylinder to lower pressure (<250 psig) piping or systems. Do not heat cylinder by any means to increase the discharge rate of product from the cylinder. Use a check valve or trap in the discharge line to prevent hazardous back flow into the cylinder.  For additional handling recommendations, consult Compressed Gas Association's Pamphlets P-1, P-14, and Safety Bulletin SB-2.		
<b>SPECIAL STORAGE RECOMMENDATIONS</b> Protect cylinders from physical damage. Store in cool, dry, well-ventilated area of noncombustible construction away from heavily trafficked areas and emergency exits. Do not allow the temperature where cylinders are stored to exceed 125F (52C). Cylinders should be stored upright and firmly secured to prevent falling or being knocked over. Full and empty cylinders should be segregated. Use a "first in - first out" inventory system to prevent full cylinders being stored for excessive periods of time. Post "No Smoking or Open Flames" signs in the storage or use area. There should be no sources of ignition in the storage or use area.  For additional storage recommendations, consult Compressed Gas Association's Pamphlets P-1, P-14, and Safety Bulletin SB-2.		
<b>SPECIAL PACKAGING RECOMMENDATIONS</b> Isobutylene is noncorrosive and may be used with any common structural material.		
<b>OTHER RECOMMENDATIONS OR PRECAUTIONS</b> Earth-ground and bond all lines and equipment associated with the isobutylene system. Electrical equipment should be non-sparking or explosion proof. Compressed gas cylinders should not be refilled except by qualified producers of compressed gases. Shipment of a compressed gas cylinder which has not been filled by the owner or with his (written) consent is a violation of Federal Law (49CFR).		

(Continued on Page 4)

Isobutylene

HEALTH HAZARD DATA

TIME WEIGHTED AVERAGE EXPOSURE LIMIT: (Continued)

Oxygen levels should be maintained at greater than 18 molar percent at normal atmospheric pressure (pO<sub>2</sub>>135 torr).

SYMPTOMS OF EXPOSURE: (Continued)

Skin and Eye Contact: It is mildly irritating to mucous membranes. Due to its rapid rate of evaporation, it can cause tissue freezing or frostbite on dermal contact.

TOXICOLOGICAL PROPERTIES: (Continued)

Persons in ill health where such illness would be aggravated by exposure to isobutylene should not be allowed to work with or handle this product.

RECOMMENDED FIRST AID TREATMENT: (Continued)

Dermal Contact or Frostbite: Remove contaminated clothing and flush affected areas with lukewarm water. DO NOT USE HOT WATER. A physician should see the patient promptly if the cryogenic "burn" has resulted in blistering of the dermal surface or deep tissue freezing.

SPECIAL PRECAUTIONS

OTHER RECOMMENDATIONS OR PRECAUTIONS: (Continued)

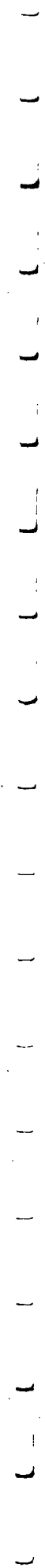
Always secure cylinders in an upright position before transporting them. NEVER transport cylinders in trunks of vehicles, enclosed vans, truck cabs or in passenger compartments. Transport cylinders secured in open flatbed or in open pick-up type vehicles.

Reporting under SARA, Title III, Section 313 not required.

NFPA 704 No. for isobutylene    =                    1    4    0    None

**ATTACHMENT C  
(FLD OPS)**

**SAFETY PROCEDURES/FIELD OPERATING PROCEDURES**



## **FLD 01      OCCUPATIONAL NOISE AND HEARING CONSERVATION**

(Final revision 11/8/1999)

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### **GENERAL**

Noise is defined as unwanted sound. Noise can cause sudden traumatic temporary or permanent hearing loss, long term slowly occurring sensory-neural and irreversible hearing loss, disruption of communication, and masking of warning devices and alarms. Increased stress levels and effects on the cardiovascular and nervous systems have been documented as additional concerns.

The goal of this operating practice is to reduce and potentially eliminate hazardous levels of noise exposure.

### **REFERENCES**

29 CFR 1910.95

### **RESPONSIBILITIES**

**Project Manager or Supervisor:** The Project Manager or employee's supervisor shall ensure that WESTON and subcontract personnel under their control comply with the requirements of this procedure and have the necessary resources to assure compliance. The Project Manager or Supervisor will ensure that hazard assessment, monitoring and control procedures have been implemented.

**Safety Officer:** The safety officer (site, project or region) shall assist the Project Manager or Supervisor in understanding the technical requirements of this practice.

**The Corporate Health and Safety (CHS) Director:** The CHS Director or his designees (e.g., safety professionals, safety officers, division safety managers, or operations health and safety group) will provide assistance with interpretations of this practice. The CHS Director will ensure periodic evaluation of this operating practice through practice review and inspections.

**Occupational Medical Provider (OMP):** WESTON's OMP will assist in compliance with this practice through evaluation of clinics, verification of baseline exams and annual employee audiogram evaluation. The OMP will advise the Safety Officer and, if necessary, the CHS Director of any problems associated with medical compliance or occupationally related hearing loss in workers.

**Employees:** All affected employees are responsible for complying with the requirements of this practice. Any concerns or questions regarding compliance is to be brought the attention of the Safety Officer, the Project Manager, or the Supervisor.

Revised 11 1999



## **Recognition and Risk Assessment**

Employee noise exposure is expressed as an eight-hour time-weighted average (full shift exposure) in decibels (dB) on the "A-scale" (dBA). This number is to be compared to the Occupational Safety and Health Administration's Permissible Exposure Limit (PEL) which is an 8-hour time-weighted average (TWA) of 90 dBA, and the OSHA Action Level (AL) which is 85 dBA. Table G-16 in 29 CFR 1910.95 provides information regarding time-equivalent PELs.

The PEL is a limit which should not be exceeded, and the AL is a noise level threshold which when exceeded obligates the employer to establish a Hearing Conservation Program (HCP). The HCP includes baseline and annual hearing tests, and hearing conservation training. Whenever there is a reasonable possibility of employee noise exposure over 85 decibels, the affected employee is enrolled in the HCP.

The need for noise monitoring equipment, noise dosimeters or hearing protection devices must be addressed in the planning stages of a project. WESTON personnel and WESTON subcontractors are to wear hearing protection devices when required and where signs are posted requiring their use.

Some of the sources of noise at hazardous materials sites, demolition operations, construction and industrial sites which can cause hearing damage are: compressor motors, drill rig engines, hammer blows (such as from a split spoon), compressor motors, compressed air, and heavy equipment. Examples of approximate noise levels from various activities are as follows:

- Rock Drilling: up to 115 dBA
- Chain Saws: up to 125 dBA
- Abrasive Blasting: up to 110 dBA
- Heavy Equipment: 95 to 110 dBA
- Demolition: up to 117 dBA
- Needle Guns: up to 112 dBA
- Riveter/Chipper: up to 120 dBA
- Noisy Factory: up to 90 dBA
- Noisy Office: 70 to 80 dBA
- Conversational Speech: 60 dBA

## **Noise Evaluation and Surveillance Procedures**

Noise exposure assessment is performed only by qualified personnel with properly calibrated and functional noise measuring equipment. If the HASP or the Safety Officer indicate that the site, or activity, requires an instrumentation survey then the area will be screened with an A-weighted sound level meter (Area Monitoring). If deemed necessary a more in depth evaluation utilizing a noise dosimeter may be performed (Personnel Monitoring). Both types of monitoring, if needed, will be accomplished in accordance with requirements established in 29 CFR 1910.95(d).

Revised 11 1999

Long-term work efforts at fixed locations (e.g., water treatment plants, incinerators, etc.) will require an evaluation of noise levels utilizing instrumentation. Re-monitoring may be necessary when changes in equipment, processes or activities result in modification of the noise level.

If impact noise is present, the peak noise levels and the frequency of the impacts should be determined. Both OSHA and the American Conference of Governmental Industrial Hygienists (ACGIH) recommend certain limits to impact noise which depend on the noise intensity and frequency of the impacts. These resources and/or qualified personnel should be consulted if questions arise regarding impact or impulse noise.

## **Noise Control Methods**

### Engineering Controls

The primary means of reducing or eliminating personnel exposure to hazardous noise is through engineering controls. Engineering controls are defined as any modification or replacement of equipment, or related physical change at the noise source or along the sound transmission path that will reduce the noise level to the employee's ear. Engineering controls include items such as; mufflers on heavy equipment or motors, sound baffles, and enclosures.

### Administrative Controls

Administrative controls are defined as changes in the work schedule or operations which reduce noise exposure. These controls include increasing worker distance from the noise source and rotation of jobs so that time limits of exposure are reduced.

Administrative time control is not a preferable method for preventing noise exposure since extreme noise for a short duration can cause severe, permanent hearing loss. Administrative controls may be utilized in accordance with the TWA Tables (see 29 CFR 1910.95, Table G-16). Administrative controls may not be utilized for exposures greater than 115 dBA, regardless of the exposure time.

### Hearing Protection

Hearing protection devices are utilized whenever engineering controls prove to be infeasible or cost prohibitive. Various types of ear muffs and ear plugs are available. Hearing protector attenuation is intended to reduce employee exposures below 85 dBA for employees with standard threshold shifts and below 90 dBA for all other employees.

Hearing protection devices are strongly recommended in any noisy environment, but are mandatory in the following situations:

- The eight hour average may equal or exceed 90 decibels.
- Any employee exposed to greater than or equal to 85 decibels and who have experienced a standard threshold shift (STS) in their hearing.
- Any noise equal to greater than 115 decibels impact, continuous or intermittent.
- Anywhere a "HEARING PROTECTION REQUIRED" sign is posted. These signs are to be posted in all mandatory situations listed above.

In the absence of sound level measuring instrumentation, any noise preventing normal vocal discussion between two individuals at arms length distance ("arms-length rule") will dictate the need for hearing protection. WESTON guidelines require the use of hearing protection on an immediate basis under the "arms-length rule". Exceptions may be granted based upon task and duration.

Not all hearing protection devices have the same noise reduction rating (NRR). Verification of all NRR values must be made by referring to the manufacturers' specifications.

The proper hearing protection is selected using results from a properly calibrated sound level meter in the following manner. The NRR of the device chosen is reduced by subtracting. Then this resulting number is subtracted from the noise level in dBA (for example: if the noise reading is 100 dBA, and the ear plugs selected have a NRR of 27. Subtracting 27 from 100 equals 73. Subtracting 73 from 100 equals 27. The attenuated sound level to the wearer is 27). Appendix B of 29 CFR 1910.95 provides information on attenuation adequacy using other monitoring devices or scales.

Hearing protection must attenuate employee exposure to an 8-hour TWA of 90 dBA or less. WESTON will strive to accomplish an attenuation of 85 dBA or less. For any employee diagnosed with a standard threshold shift, the attenuation must be 85 dBA or less.

Additional information regarding the selection, use, maintenance, and control of hearing protection devices is provided in the WESTON Personnel Protective Equipment Program.

### **Medical Surveillance**

Compliance with the Hearing Conservation Program (HCP) component of 29 CFR 1910.95 is required whenever an employee's exposure to noise in excess of 85 dBA occurs. As such, field employees whose job descriptions require work with drill rigs, heavy construction equipment or noisy client operations would be candidates for the HCP and medical surveillance requirements thereof. Supervisors of any employees not meeting the categories above (e.g., treatment plant operations, print shop, maintenance personnel) are required to determine the need for those employees to participate in the HCP by performing noise surveys, and advise their safety officer who will in turn notify the Occupational Medical Provider.

WESTON's Occupational Medical Provider will make the final determination of employee involvement in the medical surveillance component of the HCP.

Audiometric testing is performed annually to evaluate the hearing of all individuals who are routinely exposed to 8 hour TWA exposures of 85 dBA or greater (including compliance with the "arms-length rule"). By evaluating the hearing of these individuals, the overall effectiveness of the Occupational Noise and Hearing Conservation Program can be systematically monitored. WESTON's Occupational Medical Provider is responsible for assuring local clinic compliance with the audiometric testing component of the standard.

Revised 11/1999

## **Training**

Initial and annual training shall be given to each **employee** included in the Hearing Conservation Program. Training will address the following:

The effects of noise on hearing.

- The purpose of hearing protection, advantages, disadvantages, attenuation of various types, and the selection, fitting, use, and care of protectors.
- The purpose of audiometric tests and explanation of test procedures.
- Recognition of hazardous noise.

WESTON's initial and refresher courses under 29 CFR 1910.120 (Hazardous Waste Operations and Emergency Response) are utilized to deliver these training obligations. Alternative training will be given to employees who are included in the HCP but who are not trained in accordance with Hazardous Waste Operations and Emergency Response requirements.

## **Program Evaluation**

Periodic program evaluations will be conducted to assess compliance with 29 CFR 1910.95 and this operating practice. The CHS Director (or his designee) is responsible for reviewing this practice on an annual basis. WESTON's Occupational Medical Provider is responsible for assisting in this evaluation by providing information relative to employee exposure and medical surveillance data.

## **Recordkeeping**

Employee exposure measurements are retained for a minimum of two years and audiometric test records are retained for the duration of the employee's employment, plus thirty years.

Revised 11/1999

**GENERAL**

**REFERENCES**

Related FLD OPS:

*FLD05 – Heat Stress Prevention and Monitoring*

*FLD06 – Cold Stress*

*FLD25 – Working at Elevations*

*FLD26 – Ladders*

*FLD27 – Scaffolds*

**PROCEDURE**

Hot weather (ambient temperatures over 70°F), cold weather (ambient temperatures below 40°F), rain, snow, ice, and lightning are examples of inclement weather that may be hazardous or add risk to work activities. Heat stress and cold stress are covered under separate operating procedures.

Extremes of heat, cold, and humidity, as well as rain, snow, and ice, can adversely affect monitoring instrument response and reliability, respiratory protection performance, and chemical protective clothing materials.

**Heat**

Additional examples and protection from heat stress are addressed in WESTON Safety Procedure FLD05. Hot, dry weather increases risk of soil drying, erosion, and dust dispersion, which may present or increase risk of exposure and environmental impact from toxic hazards. Hot weather will increase pressure on closed containers and the rate of volatilization, thereby potentially increasing the risk of exposure to toxic, flammable, or explosive atmospheres.

**Rain, Wet Weather, and High Humidity**

Rain and wet conditions increase slipping and tripping hazards, braking distances of vehicles, and the potential for slippage or handling difficulties for devices such as augers and drills. Rain fills holes, obscures trip and fall hazards, and increases risk of electrical shock when working with electrical equipment. Changes in soil conditions caused by rain can impact trenching and excavating activities, creating the potential for quicksand formation, wall collapse, and cave-in. Vehicles become stuck in mud, and tools and personnel can slip on wet surfaces.

Rain and wet conditions may decrease visibility (especially for personnel wearing respiratory protection) and limit the effectiveness of certain direct-reading instruments (e.g., photoionization detectors [PIDs]).

## **Cold, Snow, and Ice**

In addition to cold stress, which is covered in WESTON field procedure FLD06, cold weather affects vehicle operation by increasing difficulty in starting and braking. Ice, frost, and snow can accumulate on windows and reduce vision.

Cold, wet weather can cause icing of roadways, driveways, parking areas, general work places, ladders, stairs, and platforms. Ice is not always as obvious to see as snow or rain, and requires special attention, especially when driving or walking.

Snow and ice increase the risk of accidents such as slipping when walking, climbing steps and ladders, or working at elevation, and the risk of accidents when driving vehicles or operating heavy equipment. Heavy snow and ice storms may cause electric lines to sag or break, and the use of electrical equipment in snow increases the risk of electric shock. Snow can hide potholes and mud, which can result in vehicles getting stuck or persons falling when stepping into hidden holes. Snow also may cover water, drums or other containers, sharp metal objects, debris, or other objects that can cause falls or punctures.

Personnel performing activities that require working over ice should be aware of minimal ice thickness safety guidelines as follows:

- 4-inch minimum: activities such as walking or skating.
- 6-inch minimum: activities such as snowmobiling or the use of equipment with the same weight and cross-sectional area as a snowmobile.

Personnel should always be aware that these measurements are under ideal conditions and that snow cover, conditions on rivers, ponds, or lakes with active currents, and other environmental factor impact the safety of working on ice. Clear ice typically is the strongest, while ice that appears cloudy or honeycombed is not as structurally strong. Measurements made by drilling or cutting through the ice should be made every few feet to verify safe conditions. Under no circumstances should WESTON personnel operate motor vehicles such as cars or trucks on ice.

Provisions for rescue (e.g., ladders or long poles and effective communications) must be available at the work site.

## **Lightning**

Lightning represents a hazard of electrical shock that is increased when working in flat open spaces, elevated work places, or near tall structures or equipment such as stacks, radio towers, and drill rigs. Lightning has caused chemical storage tank fires and grass or forest fires. Static charges associated with nearby electrical storms can increase risk of fire or explosion when working around flammable materials, and can adversely affect monitoring instruments.

## **Recognition and Risk Assessment**

Few Occupational Safety and Health Administration (OSHA) regulations apply to the conditions covered in this procedure; however, under specific standards (e.g., Construction Industry, Subpart P, Excavations) and the OSHA General Duty Clause, inclement weather hazards must be addressed in safety programs.

Heat, rain, cold, snow, ice, and lightning are natural phenomena that complicate work activities, and add or increase risk. The potential for physical hazards must be considered for tasks that expose personnel to inclement weather. Risk assessment can be accomplished during the planning stages of a project by developing a task risk analysis for the most likely inclement weather conditions that may be encountered, i.e., rain and lightning in late spring, summer, and early fall, or lightning prone areas; cold, snow, and ice in winter. The SHSC must make decisions on the proper safety procedure and recommend them to the site manager. Each worker must evaluate the risk associated with his or her work and be actively alert to these hazards. Any site worker may stop work if safety procedures are not followed or the risk is too great.

A pre-site activity risk assessment must be completed when inclement weather occurs. Weather conditions that affect instruments and PPE function must be conveyed to site workers. All personnel should monitor function and integrity of PPE and be alert to changing weather conditions. A decision must be made on the proper safety procedures to use if work must continue, or to stop work if the risk is too great. The Appropriate Safety Professional **must be notified of all instances of the need to stop work for safety reasons, including inclement weather.**

## **Prevention and Protection Programs**

Procedures applicable to inclement weather include the following:

Monitoring equipment and PPE must be maintained in proper working order and used according to manufacturers' instructions.

Walkways, stairs, ladders, elevated workplaces, and scaffold platforms must be kept free of mud, ice, and snow.

Vehicles used in rain or cold weather must have windshield wipers and defrosters, and windows must be kept clear of obstruction.

Employees must be protected from airborne contaminants using engineering controls such as wetting dry soil to prevent particle dispersion, and providing local ventilation to reduce volatile air contaminants to safe levels, or if engineering controls are infeasible, using prescribed personal protective equipment (PPE).

Required conformance with traffic laws, including maintaining speed within limits safe for weather conditions, and wearing seat belts at all times.

Using a walking stick or probe to test footing ahead of persons walking where there is standing water, snow, or ice to protect the walker against stepping into potholes or onto puncture hazards, buried containers, or other potential structurally unsound surfaces.

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Prior to using vehicles or equipment in off-road work, walking the work area or intended travelway when puddles or snow may obscure potholes, puncture hazards, or buried containers, or other potential structurally unsound surfaces.

Arranging to have winches, come-alongs, or other mechanical assistance available when vehicles are used in areas where there is increased risk of getting stuck. Cable or rope and mechanical equipment used for pulling stuck vehicles must be designed for the purpose, of sufficient capacity for the load, and be inspected regularly and before use to ensure safety. **Manually pushing stuck vehicles is to be avoided.**

Monitoring wind shifts and velocity where change may result in dispersion of airborne contaminants into work area.

Prior to working in areas or beginning projects during times when there is an increased likelihood of lightning or the potential for lightning striking personnel, steps must be taken to predict the occurrence of lightning strikes, including:

- a) Checking with client management to determine if there is any pattern or noted conditions that predict lightning or if there are structures that are prone to lightning strikes. Arrange for client notification when there is increased potential for lightning activities. Ensure that clients include WESTON workers in lightning contingency plans.
- b) Monitoring weather reports.
- c) Noting weather changes and conditions that produce lightning.
- d) Stopping work in open areas, around drill rigs or other structures that may attract lightning, on or in water and in elevated work places when lightning strikes are sighted or thunder is heard near a work site.
- e) Ensuring all personnel are provided with safe areas of refuge. Keep personnel from standing in open areas, under lone trees, or under drill rigs.



## **FLD 05      HEAT STRESS PREVENTION AND MONITORING**

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### **GENERAL**

Heat stress may occur at any time work is performed at elevated temperatures. Wearing chemical protective clothing often decreases natural body heat loss and increases the risk of heat stress.

If the body's physiological processes fail to maintain a normal body temperature because of excessive heat, a number of physical reactions can occur, with symptoms ranging from mild (such as fatigue, irritability, anxiety, and decreased concentration or dexterity) to fatal. Because heat stress is one of the most common and potentially serious illnesses at hazardous waste sites, regular monitoring and other preventive measures are vital to ensure worker safety.

Employees who are taking prescription or over-the-counter medications should consult with their personal physician prior to working in high-temperature environments.

### **REFERENCES**

OSHA 29 CFR 1910 and 1926

Related FLD OPS:

*FLD02 – Inclement Weather*

*FLD03 – Hot Processes – Steam*

*FLD08 – Confined Space Entry*

*FLD36 – Welding, Cutting and Burning*

*FLD37 – Pressure Washing*

### **APPENDICES**

A Common Heat Stress Disorders and Their Prevention and Treatment

### **PROCEDURE**

#### **Recognition and Risk Assessment**

In the planning stages of a project, the potential for heat stress disorders must be considered as a physical hazard in the site-specific Health and Safety Plan (HASP). Risk assessment can be accomplished in the development stages of a project by listing in the HASP the most likely heat stress disorders that may occur.

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The SHSC must make decisions on the proper safety procedures and recommend them to the site manager. Each worker must evaluate the risk associated with his or her work and be actively alert to these hazards. Any site worker may stop work if safety procedures are not followed or the risk is too great. In addition, all site personnel must be aware of these symptoms in both themselves and their co-workers.

Four common heat stress disorders and their associated prevention and treatment methods are provided in Appendix A.

### **Prevention and Protection Programs**

Heat stress is affected by several interacting factors including, but not limited to, age, obesity, physical condition, substance abuse, level of personal protective equipment worn, and environmental conditions (temperature, shade, and humidity). Site workers must learn to recognize and treat the various forms of heat stress. The best approach is preventive heat stress management such as the examples given below.

Have workers drink 16 ounces of water before beginning work, at established breaks, and in the morning or after lunch. The body's normal thirst mechanism is not sensitive enough to ensure body fluid replacement, therefore, pre- and post-work fluid intake is necessary. Under heavy work and heat conditions, the body may lose up to 2 gallons of fluids per day. In order to prevent heat stress symptoms, the individual must ensure replacement of this moisture.

Provide disposable cups that hold about 4 ounces, and water that is maintained at 50 to 60°F. Have workers drink 16 ounces of water before beginning work, and a cup or two at each break period. Provide a shaded area for rest breaks. Discourage the intake of caffeinated drinks during working hours. Monitor for signs of heat stress.

Encourage workers to maintain a good diet during these periods. In most cases, a balanced diet and lightly salted foods should help maintain the body's electrolyte balance. Bananas are especially good for maintaining the body's potassium level. The most important measure to prevent heat-related illness is adequate fluid intake. Workers should drink 1/2 to 1 quarts of liquids per hour in high heat conditions. Most of this liquid should be water.

If utilizing commercial electrolyte mixes, double the amount of water called for in the package directions. Indications are that "full-strength" preparations taken under high heat stress conditions may actually decrease the body's electrolytes.

Acclimate workers to site work conditions by slowly increasing workloads, i.e., do not begin work activities with extremely demanding tasks. Rotate shifts of workers who are required to wear impervious clothing in hot weather. In extremely hot weather, conduct field activities in the early morning and evening.

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Provide cooling devices to aid natural body heat regulation. These devices, however, add weight and their use should be balanced against worker efficiency. An example of a cooling aid is long cotton underwear, which acts as a wick to absorb moisture and protect the skin from direct contact with heat-absorbing protective clothing.

Ensure that adequate shelter is available to protect personnel against heat and direct sunlight, which can decrease physical efficiency and increase the probability of heat stress. If possible, set up the command post in the shade.

Good hygienic standards must be maintained by frequent showering and changes of clothing. Clothing should be permitted to dry during rest periods. Persons who notice skin problems should immediately consult medical personnel.

### **Heat Stress Monitoring and Work Cycle Management**

When strenuous field activities are part of on-going site work conducted in hot weather, the following guidelines should be used to monitor the body's physiological response to heat, and to manage the work cycle, even if workers are not wearing impervious clothing. These procedures should be instituted when the temperature exceeds 70°F and the tasks/risk analysis indicates an increased risk of heat stress problems. Consult the HASP and a safety professional (e.g., Division safety manager, safety officer) if questions arise as to the need for specific heat stress monitoring. In all cases, the site personnel must be aware of the signs and symptoms of heat stress and provide adequate rest breaks and proper aid as necessary.

Measure Heart Rate – Heart rate should be measured by the radial pulse for 30 seconds as early as possible in the rest period. The heart rate at the beginning of the rest period should not exceed 110 beats per minute. If the heart rate is higher, the next work period should be shortened by 33%, while the length of the rest period stays the same. If the pulse rate still exceeds 110 beats per minute at the beginning of the next rest period, the following work cycle should be further shortened by 33%. The procedure is continued until the rate is maintained below 110 beats per minute.

Measure Body Temperature – When ambient temperatures are over 90°F, body temperatures should be measured with a clinical thermometer as early as possible in the rest period. If the oral temperature exceeds 99.6°F (or 1 degree change from baseline) at the beginning of the rest period, the following work cycle should be shortened by 33%. The procedure is continued until the body temperature is maintained below 99.6°F (or 1 degree change from baseline). Under no circumstances should a worker be allowed to work if their oral temperature exceeds 100.6°F.

Measure Body Water Loss – Body water loss greater than 1.5% of total body weight is indicative of a heat stress condition. Body weight is measured before personal protective equipment (PPE) is donned and after the PPE is removed following a work cycle. Body water loss can be measured with an ordinary bathroom scale, however, the scale must be sensitive to one-half pounds increments. A worker is required to drink additional fluids and rest if their body water loss is greater than 1.5%.

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Note: For purposes of this operating practice, a **break** is defined as a 15-minute period and/or until an individual's vital signs are within prescribed **guidelines**.

A physiological monitoring schedule is determined by following the steps below:

Measure the air temperature with a standard thermometer.

Estimate the fraction of sunshine by judging what percent the sun is out (refer to Table 1).

Calculate the adjusted temperature based on the following formula:

Adjusted Temperature = Actual Temperature + 13 X  
(fraction of the percent sunshine factor)

Using Table 2, determine the physiological monitoring schedule for fit and acclimated workers.

The length of work period is governed by frequency of physiological monitoring (Table 2). The length of the rest period is governed by physiological parameters (heart rate and oral temperature). For example, site personnel anticipate wearing level C (impermeable clothing) during site activities.

The air temperature is 80°F and there are no clouds in the sky (100% sunshine). The adjusted temperature is calculated in the following manner:

Adjusted Temperature (Adj T °F) = Actual Temperature (Amb T °F) + (13 x fraction of the percent sunshine factor).

Adj T °F = 80°F + (13 x 1.0)

Adj T °F = 93°F

Using Table 2, the pulse rate, oral temperature and body water loss monitoring would be conducted after each 60 minutes of work. The adjusted temperature may need to be redetermined if the percent sunshine and ambient temperature changes drastically during site work.

If an individual's heart rate exceeds 110 beats per minute at the beginning of the rest period, that individual will continue to rest until his or her heart rate drops to baseline; the next work period is then decreased by 33%.

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**TABLE 1**

**PERCENT SUNSHINE FACTORS  
HEAT STRESS PREVENTION AND MONITORING**

Percent Sunshine (%)	Cloud Cover	Sunshine fraction
100	No cloud cover	1.0
50	50% cloud cover	0.5
0	Full cloud cover	0.0

**TABLE 2**

**PHYSIOLOGICAL MONITORING SCHEDULE  
HEAT STRESS PREVENTION AND MONITORING**

Adjusted Temperature	Level D (Permeable clothing)	Level C, B, or A (Nonpermeable clothing)
90°F (32.2°C) or above	After each 45 minutes of work	After each 15 minutes of work
87.5°F (30.8°C)-32.2°C)	After each 60 minutes of work	After each 30 minutes of work
82.5°F (28.1°C)-32.2°C)	After each 90 minutes of work	After each 60 minutes of work
77.5°F (25.3°C)-28.1°C)	After each 120 minutes of work	After each 90 minutes of work
72.5°F (22.5°C)-25.3°C)	After each 150 minutes of work	After each 120 minutes of work

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## **APPENDIX A**

### **COMMON HEAT STRESS DISORDERS AND THEIR PREVENTION AND TREATMENT**

#### **Heat Rash**

Heat rash is caused by continuous exposure to heat and humidity, and is aggravated by chafing clothes. The condition decreases an individual's ability to tolerate heat and can be extremely uncomfortable.

Symptoms – Mild red rash, especially in areas of the body that come into contact with protective gear.

Treatment – Decrease amount of time spent working in protective gear and provide body powder to help absorb moisture and decrease chafing.

#### **Heat Cramps**

Heat cramps are caused by inadequate electrolyte intake. The individual may be receiving adequate water, however, if not combined with an adequate supply of electrolytes, the blood can thin to the point where it seeps into the active muscle tissue, causing cramping.

Symptoms – Acute painful spasms of voluntary muscles, most notably the abdomen and extremities.

Treatment – Move the victim to a cool area and loosen clothing. Have the victim drink 1 to 2 cups of lightly salted water or diluted commercial electrolyte solution immediately, and then every 20 minutes thereafter until symptoms subside. Electrolyte supplements can enhance recovery (e.g., Gatorade, Quench) however, it is best to double the amount of water required by the dry mix package directions or add water to the liquid form.

#### **Heat Exhaustion**

Heat exhaustion is a state of very definite weakness or exhaustion caused by the loss of fluids from the body. The condition is much less dangerous than heat stroke, but it nonetheless must be treated.

Symptoms – Pale, clammy, and moist skin, profuse perspiration, and extreme weakness. Body temperature is normal, pulse is weak and rapid, and breathing is shallow. The person may have a headache, may vomit, and may feel dizzy.

Treatment – Move the victim to a cool, air-conditioned or temperature-controlled area, loosen clothing, place in a position with the head lower than the feet (shock prevention), and allow the victim to rest. Consult a physician, especially in severe cases. Have the victim drink 1 to 2 cups of water immediately, and every 20 minutes thereafter until symptoms subside.

## **Heat Stroke**

Heat stroke is an acute and dangerous reaction to heat stress caused by a failure of the body's heat regulating mechanisms, i.e., the individual's temperature control system (sweating) stops working correctly. Body temperature rises so high that brain damage and death may result if the person is not cooled quickly.

Symptoms – Red, hot, dry skin (although the person may have been sweating earlier); nausea, dizziness, confusion, extremely high body temperature, rapid respiratory and pulse rate, unconsciousness or coma.

Treatment – Remove the victim from the source of heat and cool the victim quickly. If the body temperature is not brought down quickly, permanent brain damage or death may result. Soak the victim in cool (not cold) water, sponge the body with cool water, or pour water on the body to reduce the temperature to a safe level (less than 102°F). Monitor the victim's vital signs and obtain immediate medical help. Do not give the victim coffee, tea, or alcoholic beverages.

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## **GENERAL**

## **REFERENCES**

Related FLD OPS:

*FLD02 – Inclement Weather*

*FLD07 – Wet Feet*

*FLD15 – Remote Areas*

*FLD17 – Diving*

*FLD18 – Using Boats*

*FLD19 – Working Over Water*

*FLD25 – Working at Elevations*

## **PROCEDURE**

Persons working outdoors in low temperatures (below 40°F), and especially at or below freezing, are subject to cold stress. Exposure to extreme cold for a short time can cause severe injury to the surface of the body, or result in profound generalized cooling which, unchecked, could ultimately cause death. Areas of the body that have high surface-area-to-volume ratios, such as fingers, toes, and ears, are the most susceptible.

Chemical protective clothing generally does not afford protection against cold stress. In many instances, it increases susceptibility. Chemical hazard site workers must learn to dress carefully to provide both chemical protection and thermal insulation while not dressing so warmly that exercise or strenuous activity will result in cold stress.

Body heat is conserved through the constriction of surface blood vessels. This constriction reduces circulation at the skin layers and keeps blood nearer the body core.

Loss of body heat can occur through:

1. Respiration – In extreme cold, cover the mouth and nose with wool or fur to “pre-warm” the air you breath.
2. Evaporation – Wear layered clothing, and remove outer layers prior to overheating to avoid soaking clothing with perspiration. Replace layers prior to becoming chilled. Wear clothing that will “breath” or allow water vapor to escape to reduce the cooling effect of evaporation.
3. Conduction – Sitting on snow, touching cold equipment, and working in the rain are examples of how heat can be lost by conduction. A great deal of body heat is lost rapidly when a person becomes wet. Hypothermia from immersion in water has resulted in death at temperatures of 40°F or lower. Perspiration or rain should never be allowed to saturate clothing; such soaking will seriously reduce the insulative properties of the clothing, in addition to increasing heat loss. Most clothing loses approximately 90 percent of its insulating properties when wet.

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4. Radiation – The greatest amount of body heat is lost from uncovered surfaces of the body, especially the head, neck, and hands. Covering these areas is, therefore, extremely important.
5. Convection – The body continually heats a thin layer of air next to the skin. As long as this warm air is retained next to the body, it will remain warm. If this warm air is removed by air currents (wind), the body will be cooled attempting to rewarm the surface air. The primary function of clothing is to retain this warm surface layer of air while allowing water vapor to pass through. Ensure that clothing remains secure around the body, especially at the neck and waist. Wind chill or equivalent chill temperature indices describe the chilling effect of moving air in combination with low temperature.

Two major factors that influence the potential of cold injury are ambient temperature and wind velocity. The term wind chill is used to describe the chilling effect of moving air in combination with low temperature. Additionally, water conducts heat 240 times faster than air; thus, the body cools suddenly when protective equipment is removed if the clothing underneath is perspiration-soaked.

Tables 1 and 2 should be consulted to adjust working schedules for wind chill conditions. These tables are meant as guides only; ambient temperatures and wind conditions should be monitored frequently and work schedules adjusted as required. Workers' physical symptoms or condition will also be an indicator of the need to modify work schedule.

### **Recognition and Risk Assessment**

In the planning stages of a project and safety plan, the potential for cold stress disorders must be considered as physical hazards in the site-specific Health and Safety Plan (HASP). Risk assessment can be accomplished in the development stages of a project by listing in the HASP the most likely cold stress disorders which may occur. The SHSC must make decisions on the proper safety procedures and recommend them to the site manager. Each worker must evaluate the risk associated with his or her work and be actively alert to these hazards. Any site worker may stop work if safety procedures are not followed or the risk is too great. Two common cold stress disorders and treatment methods are identified below.

#### **Frostbite**

Local injury resulting from cold is included in the generic term frostbite. By definition, frostbite is the freezing of tissue, however, several stages are recognized, based on the degree of injury.

Frostbite most commonly affects the toes, fingers, and face, and occurs when an extremity loses heat faster than it can be replaced by the circulating blood. Frostbite may also result from direct exposure to extreme cold or high wind, as happens with the nose, ears, and hands. Feet may freeze because of the conduction of heat away from the skin's surface caused by damp socks and shoes.

Frostbite of the extremities can occur in three forms:

- Frost nip or incipient frostbite is characterized by sudden blanching or whitening of skin.
- Superficial frostbite is characterized by skin with a waxy or white appearance that is firm to the touch, but the tissue beneath is resilient.
- Deep frostbite is characterized by tissues that are cold, pale or darkened, and solid.

Treatment for frostbite:

- Move the victim indoors and/or away from additional exposure to cold, wet, and wind.
- Superficially frostbitten areas are best warmed by placing them next to warm skin. The basic tenant to rewarming frostbitten areas is to not raise the temperature much above that of the body. The abdomen and the armpit are body areas that can be used to rewarm frostbitten areas. Water at 99° to 104°F can be used. Avoid the use of fires, hot water, or external heaters to warm frostbitten areas.
- Give a warm drink (water or juices, **not** coffee, tea or alcohol). Do not allow the victim to smoke.
- If using water to rewarm the affected areas, keep the frozen parts in warm water until all paleness has turned to pink or burgundy red, but no longer. Remember, the tissue will be very painful as it thaws.
- After rewarming, elevate the area and protect it from further injury.
- Do not break blisters.
- Use sterile, soft, dry material to cover the injured areas.
- Keep victim warm and obtain medical care as necessary.
- Do **not** rub the frostbitten part (this may cause gangrene).
- Do **not** use ice, snow, gasoline or anything cold on the frostbitten area.
- Do **not** use heat lamps or hot water bottles to rewarm the frostbitten area.
- Do **not** place the frostbitten area near a hot stove.

## Hypothermia

Systemic hypothermia occurs when body heat loss exceeds body heat gain and the body core temperature falls below the normal 99°F. While many hypothermia cases are caused by extremely cold temperatures, most cases develop in air temperatures between 30° and 50°F, especially when compounded with water immersion or soaking, and windy conditions.

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Remember that the victim of hypothermia may not know, or refuse to admit, that he or she is experiencing hypothermia. All personnel must be observant for these signs for themselves and for other team members. Hypothermia can include one or more of the following symptoms.

- Uncontrollable shivering.
- Vague, slow, slurred speech.
- Irrational actions.
- Memory lapses.
- Incoherence.
- Fumbling hands, frequent stumbling, lurching gait.
- Apathy, listlessness, and sleepiness' inability to get up after resting.
- Unconsciousness, glassy stare, slow pulse and slow respiration.
- Death.

Below the critical body core temperature of 95°F, the body cannot produce enough heat by itself to recover. At this point, emergency measures must be taken to reverse the drop in core temperature. The victim may slip into hypothermia in a matter of minutes and can die in less than 2 hours after the first signs of hypothermia are detected. Treatment and medical assistance are critical.

Treatment for hypothermia:

- Prevent further heat loss by moving the person to a warmer location out of the wind, wet, and cold.
- Remove cold, wet clothing. If necessary, based upon the victim's condition, external sources of heat (e.g., warm blankets, warm water baths, or body contact) may be necessary to rewarm the victim.
- If the victim is conscious, provide warm liquids, candy, or sweetened foods. Carbohydrates are the food most quickly transformed into heat and energy. Do not give alcohol or caffeine.
- Keep the victim awake, monitor ABCs, perform first aid as appropriate, and obtain medical assistance soon as possible.

### **Prevention and Protection Programs**

Site workers must learn to recognize and treat the various forms of cold stress. The best approach is preventive cold stress management, such as the following:

- Wear loose, layered clothing, masks, woolen scarves, and hats in extreme cold weather.
- Keep clothes dry by wearing water and wind resistant clothing and footwear.
- Eat well-balanced meals, ensure adequate intake of liquids and avoid alcoholic beverages. Dehydration increases risk of cold stress.
- Have warm shelter available and implement work-rest schedules.
- Monitor yourself and others for changes in physical and mental condition.

- If wearing a face protector, remove it **periodically** to check for frostbite.
- Never touch cold metal with bare hands.

The following guidelines should be used when working in air temperatures below 40°F.

- When cold surfaces below  $-7^{\circ}\text{C}$  (19.4°F) are within reach, a warning should be given to each worker by the SHSC to prevent inadvertent contact by bare skin.
- If the air temperature is  $-17.5^{\circ}\text{C}$  (0°F) or less, the hands should be protected by mittens. Machine controls and tools for use in cold conditions should be designed so that they can be handled without removing the mittens.

Provisions for additional total body protection are required if work is performed in an environment at or below  $4^{\circ}\text{C}$  (39.2°F). Workers should wear cold-protective clothing appropriate for the level of cold and physical activity:

- If the air velocity at the job site is increased by wind, draft, or artificial ventilation, the cooling effect of the wind should be reduced by shielding the work area or by wearing an easily removable windbreak garment.
- If only light work is involved and if the worker's clothing may become wet on the job site, the outer layer of the clothing in use may be of a type impermeable to water. With more severe work under such conditions, the outer layer should be water repellent, and the outerwear should be changed as it becomes wetted. The outer garments should include provisions for easy ventilation to prevent wetting of inner layers by sweat. If work is done at normal temperatures or in a hot environment before entering the cold area, the employee should make sure that clothing is not wet as a consequence of sweating. If clothing is wet, the employee should change into dry clothes before entering the cold. Workers should change socks and any removable felt insoles at regular daily intervals, or use vapor barrier boots. The optimal frequency of change should be determined empirically and will vary individually and according to the type of shoe worn and how much the individual's feet sweat.
- If the available clothing does not give adequate protection to prevent hypothermia or frostbite, work should be modified or suspended until adequate clothing is made available or until weather conditions improve.
- Workers handling evaporative liquid (gasoline, alcohol, or cleaning fluids) at air temperatures below  $4^{\circ}\text{C}$  (39.2°F) should take special precautions to avoid soaking clothing or gloves with the liquid because of the added danger of cold injury due to evaporative cooling.

### **Work/Warming Regimen**

If work is performed continuously in the cold at an equivalent chill temperature (ECT) or below  $-7^{\circ}\text{C}$  (19.4°F), heated warming shelters, tents, cabins, and break rooms should be made available nearby. Workers should be encouraged to use these shelters at regular intervals, frequency depending on the severity of the environmental exposure. The onset of heavy shivering, frostnip, the feeling of excessive fatigue, drowsiness, irritability, or euphoria are indications for immediate return to the shelter. When

entering the heated shelter, the outer layer of clothing should be removed and the remainder of the clothing loosened to permit sweat evaporation, or the worker should change into dry clothing to avoid returning to work in wet clothing. Dehydration, or the loss of body fluids, occurs insidiously in a cold environment and may increase the susceptibility of workers to cold injury due to a significant change in blood flow to the extremities. Warm sweet drinks and soups should be provided at the work site to provide caloric intake and fluid replacement. The intake of caffeinated drinks should be limited because of the diuretic and circulatory effects.

For work practices at or below  $-12^{\circ}\text{C}$  ( $10.4^{\circ}\text{F}$ ) ECT, the following should apply:

- The worker should be under constant protective observation (buddy system or supervision).
- The work rate should not be so high as to cause heavy sweating that will result in wet clothing. If heavy work must be done, rest periods must be taken in heated shelters and opportunities to change into dry clothing should be provided.
- New employees should not be required to work full-time in the cold during the first days of employment until they become accustomed to the working conditions and the use of required protective clothing.
- The weight and bulkiness of clothing should be included in estimating the required work performance and weights to be lifted by the worker.
- The work should be arranged in such a way that sitting or standing still for long periods is minimized. The worker should be protected from drafts to the greatest extent possible.
- The workers should be instructed in safety and health procedures. The training program should include, as a minimum, instruction in:
  - Proper rewarming procedures and appropriate first aid treatment.
  - Proper use of clothing.
  - Proper eating and drinking habits.
  - Recognition of signs and symptoms of impending hypothermia or excessive cooling of the body, even when shivering does not occur.
  - Safe work practices.

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Table 1

## Cooling Power of Wind on Exposed Flesh Expressed as Equivalent Temperature\*

Actual Temperature Reading (°F)												
Estimated Wind Speed (mph)	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60
Equivalent Chill Temperature (°F)												
Calm	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60
5	48	37	27	16	6	-5	-15	-26	-36	-47	-57	-68
10	40	28	16	4	-9	-24	-33	-46	-58	-70	-83	-95
15	36	22	9	-5	-18	-32	-45	-58	-72	-85	-99	-112
20	32	18	4	-10	-25	-39	-53	-67	-82	-96	-110	-121
25	30	16	0	-15	-29	-44	-59	-74	-88	-104	-118	-133
30	28	13	-2	-18	-33	-48	-63	-79	-94	-109	-125	-140
35	27	11	-4	-20	-35	-51	-67	-82	-98	-113	-129	-145
40	26	10	-6	-21	-37	-53	-69	-85	-100	-116	-132	-148
(Wind speeds greater than 40 mph have little additional effect.)	LITTLE DANGER In <1 hour with dry skin. Maximum danger of false sense of security.	INCREASING DANGER Danger from freezing of exposed flesh within 1 minute.					GREAT DANGER Flesh may freeze within 30 seconds.					
	Trenchfoot and immersion foot may occur at any point on this chart.											

\* Developed by U.S. Army Research Institute of Environmental Medicine, Natick, MA.

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Table 2

Cold Work/Warmup Schedule for 4-Hour Shifts,

EQUIVALENT CHILL TEMPERATURE	MAXIMUM WORK PERIOD	NO. OF BREAKS
$\geq -24^{\circ}\text{F}$	Normal	1
$-25^{\circ}$ to $-30^{\circ}\text{F}$	75 minutes	2
$-31^{\circ}$ to $-35^{\circ}\text{F}$	55 minutes	3
$-36^{\circ}$ to $-40^{\circ}\text{F}$	40 minutes	4
$-41^{\circ}$ to $-45^{\circ}\text{F}$	30 minutes	5
$\leq -46^{\circ}\text{F}$	Stop work	Stop work

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## FLD 07      WET FEET

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### GENERAL

### REFERENCES

Related FLD OPS:

*FLD05 – Heat Stress Prevention and Monitoring*

*FLD06 – Cold Stress*

### PROCEDURE

Under both hot and cold stress conditions, feet that become wet and are allowed to remain wet can lead to serious problems. Trench foot, paddy foot, and immersion foot are terms associated with foot ailments resulting from feet being wet for long periods of time. All have similar symptoms and effects. Initial symptoms include edema (swelling), tingling, itching, and severe pain. These may be followed by more severe symptoms including blistering, death of skin tissue, and ulceration.

#### **Recognition and Risk Assessment**

In the planning stages of a project and safety plan, the potential for wet feet must be considered as a physical hazard. Risk assessment can be accomplished in part in the development stages of a project by listing in the Health and Safety Plan (HASP), the most likely task where wet feet may occur. These tasks could include extended work in chemical protective clothing and wading during biological assessments. The SHSC must make decisions on the proper safety procedures and recommend them to the site manager. Each worker must evaluate the risk associated with his or her work and be actively alert to these hazards. Any site worker may stop work if safety procedures are not followed or the risk is too great.

#### **Prevention and Protection Program**

Prevention methods are required when work is performed in wet conditions or when conditions result in sweating, causing the feet to become and remain wet. Proper hygiene is critical. Workers must dry their feet and change socks regularly to avoid conditions associated with wet feet. Use of foot talc or powder can additionally assist in prevention of this type of condition.

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## **FLD 08      CONFINED SPACE ENTRY PROGRAM**

(Final revision 6/25/2003)

### **GENERAL**

A confined space is any space having:

- a limited or restricted means of entry or exit,
- large enough and so configured that an employee can bodily enter and perform assigned activities, and
- conditions not designed for continuous employee occupancy.

Confined spaces can subject personnel to the accumulation of toxic or flammable contaminants, contain physical hazards, or have an oxygen-deficient atmosphere. This program contains requirements, practices, and procedures which must be followed in order to protect WESTON employees from the hazards associated with entry to confined spaces.

This operating procedure, including the application of other operating procedures in WESTON's written Health and Safety Program, constitutes WESTON's written Confined Space Program. Due to the complexity and various types of confined space hazards encountered by WESTON personnel this program must be augmented by site-specific procedures.

Additional information regarding confined space entry can be found in 29 CFR 1926.21, 29 CFR 1910.146 and NIOSH 80-106. Compliance with the conditions of this operating practice and any additional, more restrictive, requirements issued by state or local governments or clients constitute the minimum acceptable actions in WESTON's Confined Space Program.

### **REFERENCES**

29 CFR 1910.146

29 CFR 1926.21

FLD 09 Hot Work

FLD 42 Lock out / Tag out

### **Responsibilities**

**Project Manager or Site Manager:** The Project Manager (PM) or Site Manager (SM) shall ensure that WESTON personnel and subcontractor personnel comply with the requirements of this program and have the necessary resources to assure compliance. The PM or SM must conduct periodic evaluation of confined space entry activities to ensure compliance with this procedure and must review permits within 10 working days after the entry is completed. The PM or SM must review each Notice of Incident or Near-Incident that is related to a confined space entry on his/her project within 24 hours of the date of the report. Any conditions noted during these reviews that indicate a need to revise this procedure will be immediately reported in writing to the Corporate Environmental Health and Safety Director.

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Site Health and Safety Coordinator (SHSC): The SHSC shall assist the PM or Site Manager by providing technical support for implementation of this procedure.

Corporate Environmental Health and Safety (CEHS) Director: The CEHS Director or his designees shall revise and maintain this procedure, as necessary. This procedure will be revised when regulatory changes or project conditions warrant potential changes. Project conditions that indicate the need for revision of this procedure will be brought to the attention of the CEHS Director by PMs or SMs who note shortcomings during their reviews of site entries and entry permits on their projects. This continuous review process will meet the regulatory requirement for at least an annual review of the confined space entry program.

Confined Space Entrant: Specific duties required of the confined space entrant are as follows:

- Know and understand the hazards of the specific confined space.
- Use the equipment required properly for safe entry.
- Communicate with the attendant as necessary and/or required.
- Alert the attendant immediately if any warning signs or symptoms of exposure are detected, or any condition not allowed by the permit (prohibited condition) is detected.
- Comply with the requirements of this procedure and any applicable confined space entry permits.
- Exit from the space immediately if an order to evacuate is given by the attendant or entry supervisor, the entrant recognizes any warning signs or symptoms of exposure, he entrant detects a prohibited condition, or an evacuation alarm is activated.

Confined Space Attendant: Specific duties of the confined space attendant are as follows:

- Know and understand the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of exposure to atmospheric hazards and the types and injury potential of physical hazards anticipated.
- Know possible behavioral effects of exposure to hazards in the space.
- Remain outside the space during entry operations until relieved by another qualified attendant.
- Communicate with entrants as necessary to monitor entrant status and alert entrants of the need to evacuate the space if necessary.
- Maintain an accurate count of and document the identity of all personnel in the space.
- Ensure unauthorized personnel do not enter the space or perform activities that may increase the risk to entrants. Inform the authorized entrants and confined space supervisor if unauthorized personnel enter the confined space.

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- Monitor the activities and conditions inside the space, and provide external assistance to those in the space. The attendant will have no other duties which may distract his attention from the work or require him to leave his post at the confined space at any time while personnel are in the space.
- Maintain some form of contact with all personnel in the confined space. Visual contact is preferred, if possible. Additional communications would include a 2-way radio, voice, or video. The attendant shall be constantly aware of possible behavioral effects due to hazard exposure to entrants.
- Be knowledgeable in the method for contacting rescue personnel and immediately initiate those contacts in the event of an emergency. All communications equipment and rescue equipment (if required) will be available and in working condition at all times personnel are within the space.
- Order personnel within the space to exit immediately if irregularities within the space are detected by the observer. Such irregularities would include subtle behavioral changes in entrants, changes in speech patterns, variations in established communications procedures, and inappropriate actions by unauthorized personnel.
- NEVER enter the confined space in the event of an emergency prior to summoning emergency/rescue services and contacting and receiving assistance from a helper. A properly qualified helper shall be available to provide assistance to the confined space attendant in case the observer must enter the confined space to retrieve personnel.
- Prior to the arrival of assistance or a replacement certified attendant, the attendant should attempt to remove personnel with the lifeline and to perform all other rescue functions from outside the space.

**Confined Space Entry Supervisor:** The entry supervisor performs oversight and verification activities to ensure that entry requirements are fully implemented. Specific duties of the entry supervisor are as follows:

- Know and understand the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of exposure to atmospheric hazards and the types and injury potential of physical hazards anticipated.
- Verify that all entries on the permit have been completed, all monitoring/testing has been conducted, and all procedures and equipment necessary to effect safe entry are in place prior to endorsing the permit and allowing the entry to begin.
- Terminate the entry and cancel the permit as required upon completion of task, expiration of the permit time-frame, or upon evacuation of the space due to unforeseen circumstances or emergency situations.
- Verify that emergency/rescue services are available and that the means for summoning them are operable.

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- Remove or arrange for removal of **unauthorized** personnel who enter or attempt to enter the space during entry operations.
- Ensure that entry operations remain consistent with the acceptable entry conditions and permit requirements at all times.
- Turn over to the PM or SM canceled Confined Space Entry Permits (CSEPs) for review, follow –up with the CEHS Director as necessary, and placement in the project files.

The duties of the attendant and supervisor may be assigned to a single individual as long as that person is trained and equipped to perform each duty. When necessary, more than one person will be used.

### **Recognition and Risk Assessment**

Confined spaces can include, but are not limited to storage tanks, process vessels, bins, boilers, ventilation or exhaust ducts, sewers, underground utility vaults, tunnels, pipelines, and open-top spaces more than 4 feet in depth such as pits, tubs, vaults, and vessels.

Entering confined spaces presents many health and safety hazards if not performed properly. These hazards include asphyxiation, falls, burns, drowning, engulfment, toxic exposure, and electrocution. A confined space represents the potential for unusually high concentrations of contaminants, explosive atmospheres, limited visibility, physical injury, and restricted movement.

### **Initial Procedure for All Confined Spaces**

1. The PM or SM will coordinate with the client to identify local confined spaces and hazards associated with these spaces. In the event subcontractors will enter confined spaces under WESTON control, verification of training and regulatory compliance will be made prior to any entry operation. Lockable doors, gates, grates, or other effective measures shall be implemented to prevent unauthorized entry into any confined space identified at a WESTON site.
2. When possible, confined spaces are to be identified with a posted sign which reads: “DANGER — PERMIT-REQUIRED CONFINED SPACE — DO NOT ENTER”. WESTON operations (e.g., incinerators, water or waste treatment facilities) which contain confined spaces meeting the definition under this procedure must be posted as described.
3. No task involving entry to a confined space may begin until an initial evaluation is made of the hazards associated with the space and the results documented. This initial evaluation will be completed without entering the space. The Confined Space Entry Permit (CSEP) form, or an equivalent format, must be used to document the initial evaluation. A copy of the form is provided in Attachment 1. The CSEP form must also be used to document on-going evaluations and monitoring of the conditions within the confined space, and must be reissued at the beginning of each shift during which work will be performed in the space.
4. Only personnel trained and knowledgeable of the requirements of these confined space entry procedures will be authorized to conduct or supervise initial evaluations. Natural ventilation shall be provided in the confined space prior to initial evaluation.

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5. Remote atmospheric testing of the confined space during the initial evaluation will include the following monitoring:
  - Verification of oxygen content.
  - Verification of non-flammable, non-explosive atmosphere.
  - Verification of potential or known air contaminant concentrations (ensure that levels are within the acceptable entry criteria for the planned level of protection).
6. In addition, the confined space and its surroundings will be physically inspected and the following conditions will be specifically identified and noted:
  - Potential sources of engulfment by liquid or solid materials,
  - Internal configurations or conditions that could trap or asphyxiate entrants, or
  - Other recognizable safety or health hazards.
7. Based on the results of the initial evaluation, the space will be identified as one of the following three types of confined spaces:
  - Permit-Required Confined Spaces,
  - Conditional Entry Confined Space, and
  - Non-Permit Entry Confined Spaces.

Definitions are provided for each type in the following section, along with the applicable procedures and precautions for entry to the space.

### **Permit-Required Confined Space Procedures**

A permit-required confined space is defined as any confined space that has one or more of the following characteristics:

- a. Contains or has the potential to contain a hazardous atmosphere. Hazardous atmosphere means an atmosphere that may expose employees to the risk of death, incapacitation, impairment of ability to self-rescue, injury, or acute illness from one or more of the following causes:
  - Flammable gas, vapor, or mist in excess of 10% of it's lower explosive level (LEL);
  - Airborne combustible dust at a concentration that meets or exceeds it's LEL;
  - Atmospheric oxygen concentration below 19.5% or above 23.5%;
  - Atmospheric concentration of any substance with a published exposure value in excess of it's dose or permissible exposure limit;

- Any other atmospheric condition **that** is immediately dangerous to life or health (IDLH).
- b. Contains a material that has the **potential** to engulf an entrant,
- c. Has an internal configuration such **that** an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor **which** slopes downward and tapers to a smaller cross-section; or
- d. Contains any other recognized serious safety or health hazard.

The following conditions and requirements **apply** when entering permit-required confined spaces:

1. Evaluate the job to be done and identify the **potential** hazards before a job in a confined space is scheduled.
2. Ensure that all process piping, mechanical and electrical equipment, and other items as necessary have been disconnected, purged, or blanked-off as necessary. Sources of hazardous energy (e.g., electrical, pneumatic, hydraulic or mechanical energy which could be activated in any area of the confined space) must be identified, tagged, and locked-out prior to anyone entering a confined space. Lockout/tagout procedures must be documented in the CSEP.
3. The contents of any confined space shall, where feasible, be removed prior to entry. If possible, ensure removal of any materials from the space that may produce toxic or air displacing gases, vapors, or dust. All sources of ignition **must** be eliminated prior to entry. Smoking in confined spaces is prohibited.
4. Ensure that any hot work (welding, burning, open flames, or spark-producing operation) that is to be performed in the confined space has **been** approved, documented on a Hot Work Permit, and indicated on the CSEP. For hot work performed in confined spaces, no combustible or flammable gases or vapors and no concentrations of combustible dusts may be evident.
5. Ensure that the confined space is ventilated **before** starting work and for the duration of the time that the work is to be performed in the space, unless limited by design.
6. Ensure that the personnel who enter the confined space, the entry supervisor, and the confined space attendants have completed required training and are familiar with the contents/conditions in the space, the permit requirements, and the requirements of this procedure.
7. Ensure that specialized communication equipment, personal protective equipment, and rescue services are available, operating appropriately, and used as required by the permit. Ensure that training in the use of the specialized equipment has been completed and documented for the appropriate personnel. (Refer to sections of this procedure that address training and rescue services.)
8. A Confined Space Entry Permit (CSEP) **must** be issued prior to the performance of any work within the confined space. The CSEP must either be posted at the confined space or available with the attendant. The CSEP shall be canceled by the Entry Supervisor at the completion of the job or the end of the shift, whichever is first. Upon termination, the CSEP will be reviewed by the PM or SM and will become a part of the permanent and official record of the site. Only trained personnel

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who are knowledgeable of the requirements of these confined space entry procedures will be authorized to enter a confined space (authorized entrant), be a confined space attendant (attendant), or supervise the entry (entry supervisor).

9. If a hazardous atmosphere is suspected or known and if remote testing of all areas of the confined space is not possible, Level B personal protective equipment (PPE) is required. A monitor for oxygen content and combustible gases will be carried into the confined space with the entry team. Periodic and/or continuous monitoring for levels of other atmospheric contaminants must be conducted by the attendant or the entry team as appropriate.
10. If positive/forced mechanical ventilation is used to achieve an acceptable atmosphere, care must be taken to prevent the spread of contamination outside of the enclosed area. Chemicals and toxic materials shall be removed from the vicinity of the air inlet to prevent their introduction into the confined space.
11. Intrinsically-safe equipment (instruments, lighting, etc.) will be used if actual or potential flammable or explosive conditions may exist in the confined space.
12. Hand tools used in confined spaces shall be in good repair and selected according to intended use.
13. Hand-held lights and other illumination utilized in permit-required confined spaces shall be equipped with guards to prevent contact with the bulb.
14. Compressed gas cylinders, except cylinders used for self-contained breathing apparatus, shall not be taken into confined spaces. Gas hoses shall be removed from the space and the supply turned off at the cylinder valve when personnel exit from the confined space.
15. Safety belts, body harnesses, and lifelines must be used unless a determination can be made that use of the retrieval system increases risk to the entrant and will not assist in retrieval. For entry into vertical type permit-required confined spaces greater than 5 feet deep, a mechanical device must be available to retrieve personnel. The attendant shall be provided with appropriate equipment for emergency response, communication, and rescue purposes, and shall be trained in the use of the equipment.
16. Self-contained breathing apparatus or NIOSH-approved airline respirators equipped with a minimum 5-minute emergency air supply (egress bottle) shall be used in confined spaces which cannot be completely characterized or monitored, with conditions determined immediately dangerous to life and health, or meeting the conditions requiring Level B protective equipment.
17. Vehicles shall not be left running near confined space work or near air-moving equipment being used for confined space ventilation.
18. Any deviation from these Confined Space Entry Procedures requires the prior permission of the Project Manager.

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## **Permit-Required Confined Space – Conditional Entry Procedure**

Conditional entry to a Permit-Required Confined Space may be made without full compliance with the permit-required confined space criteria under the following conditions if forced air ventilation is used and shown to control all hazards in the space:

- The space only poses the hazard of an actual or potential hazardous atmosphere, not hazards associated with engulfment, entrapment or asphyxiation, or other recognizable safety or health risks,
- It is demonstrated and documented that continuous forced ventilation into the immediate areas occupied by workers will maintain safe entry conditions,
- There is no hazardous atmosphere within the space whenever employees are inside. Frequent monitoring must continue to show that the atmosphere is continually at or below one-half of the published exposure value for any contaminant,
- If a hazardous atmosphere develops: 1) the space must be immediately evacuated, 2) the space must be evaluated to determine how hazards developed and 3) measures must be implemented to ensure employee safety prior to subsequent entry.

Monitoring and documentation are required prior to implementation of this option. If the above conditions can be met, entry can be made without following steps 7, 11, and 16 from the Permit-Required Entry procedure. Specialized personal protective equipment, outside communications, and rescue service must not be required for conditional entry.

These types of confined spaces may, after initial monitoring and evaluation, also be entered without attendant oversight and for extended time-periods, as necessary. Monitoring to verify the continued presence of a safe atmosphere must be maintained. Allowance for entry under these conditions must be indicated in the Health and Safety Plan (HASP).

Should any condition arise within the confined space that is contrary to the allowable conditions, all entrants must leave the space. Re-entry is allowed only under full permit requirements or upon correction of conditions leading to non-compliance.

## **Non-Permit Entry Confined Space Procedure**

Under the following conditions a confined space may be entered without full compliance with the permit-required confined space criteria. These criteria are allowed only if the space meets the following conditions without employing forced air ventilation:

- a. It has no actual or potential hazardous atmosphere.
- b. Any other hazard(s) within the space are eliminated without entry into the space.
- c. The space is monitored and documentation maintained to verify that no hazardous atmosphere is evident. (*Note: the use of forced ventilation does not constitute elimination of atmospheric hazards.*)
- d. If entry into the space must be made to eliminate all hazards, the entry must be made under full permit requirements.

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Under WESTON's Non-Permit Entry Criteria, if the above conditions can be met, entry can be made without the following: (1) specialized personal protective equipment, (2) outside communications, and (3) rescue service compliance. Compliance with all other provisions of the permit must be maintained.

These types of confined spaces may, after initial monitoring and evaluation, also be entered without attendant oversight and for extended time-periods, as necessary. Allowance for entry under these conditions must be indicated in the Health and Safety Plan (HASP).

Should any condition arise within the confined space that is contrary to the allowable conditions, all entrants must leave the space. Re-entry is allowed only under full permit requirements or upon correction of conditions leading to non-compliance.

### **Rescue and Emergency Operations**

The Health and Safety Plan must indicate names and phone numbers of rescue and medical response agencies or personnel. It must be determined prior to on-site entry operations whether entry rescue or non-entry rescue will be required. In the event that entry rescue is necessary, an evaluation of off-site responders (e.g., local fire department teams) or the use of on-site or employee rescue teams will be made by the SHSC and/or Entry Supervisor.

Technical capabilities of any off-site responders must be evaluated and the ability to respond within necessary time-frames must be documented. Off-site responders must be allowed the option of visiting the site and evaluating the confined spaces prior to entry activities.

Should it be decided that WESTON personnel on-site will perform entry rescue, those personnel must be trained specifically in accordance with the hazards, configuration of the confined spaces encountered, and equipment to be used. Site-specific training and rescue procedures will be documented and implemented.

### **Entry Rescue**

The following criteria apply to personnel who will perform emergency rescue operations within confined spaces. In addition, minimal equipment required to be worn by entrants for efficient rescue will be indicated.

- All rescue personnel shall be trained to perform assigned duties. Training shall consist minimally of that afforded to entrants, attendants and supervisors.
- **All rescue personnel will be provided with and trained to use properly, the personal protective equipment and rescue equipment necessary for making rescues from confined spaces.**
- All rescue personnel will practice making confined space rescues at least once every 12 months.
- Each member of the rescue team will be trained in CPR and first aid. At least one member will hold current certification.

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## **Non-Entry Rescue**

In order to facilitate non-entry rescue, retrieval systems or methods will be used whenever an authorized entrant enters a permit-required confined space, unless the use of retrieval equipment would increase the overall risk of entry or would not contribute to the rescue of the entrant. Entry procedures which propose not to use retrieval equipment must be identified and approved within the health and safety plan. Retrieval systems will meet the following requirements:

- Each entrant will use either a chest or a full-body, harness, properly worn with the retrieval line attached at the center of the entrants back.
- Wristlets may be used in lieu of the chest or full-body harness if it can be demonstrated that the use of the harness is not feasible or creates a greater hazard
- The end of the retrieval line outside of the confined space must be attached to a mechanical device or a fixed point outside the permit space so that non-entry rescue can be initiated as soon as necessary.
- A mechanical device must be available to retrieve personnel from vertical type permit spaces more than 5 feet deep.

Minimal equipment required for non-entry rescue is as follows:

- First aid kit.
- Full body harness and retrieval line.
- Retrieval device (optional based upon depth and configuration of space).
- Communications equipment to outside assistance (on- or off-site).

## **Training**

Prior to allowing any employee to enter confined spaces, training and certification of training proficiency must be provided. All employees involved in confined space entry, whether as authorized entrants, attendants, rescuers or entry supervisors, will receive training designed to provide knowledge, skills, and competence necessary for the safe performance of duties assigned during confined space evaluation and entry. Training shall be provided to all affected employees as follows:

- Prior to performing assigned duties.
- Prior to a change in assigned duties.
- Whenever the confined space presents a hazard to which the affected employees have not been trained.
- Whenever there is evidence of deviation from the established procedure or evidence that procedures are not protective of the affected employees.

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WESTON will ensure that all participants receive training that will combine and indicate proficiency, allowing personnel to function as entrants, attendants and supervisors.

Minimal training criteria for entrants, attendants, and supervisors are as follows:

- Knowledge of the hazards that may be faced during entry including information on the mode, signs or symptoms, and consequences of exposure.
- Knowledge of and demonstrated proficiency in the performance of the duties as appropriate for the role of the employee in the entry process (entrant, attendant, or supervisor).
- Use, maintenance, and calibration of monitoring instrumentation.
- Use of ventilation equipment.
- Use of communication equipment.
- Use of personal protective equipment appropriate.
- Use and selection of lighting equipment.
- Use and selection of barriers and/or shields necessary to prevent the entry of unauthorized personnel or adverse conditions into the space.
- Use and selection of ingress and egress equipment.
- Use and selection of rescue and emergency equipment.
- Use and selection of any specialized or other equipment needed for safe entry and rescue from the confined space.

Entry supervisors will also complete WESTON's 8-Hour Site Managers and Supervisors (SHSC) Training Course.

Rescue practice/proficiency training for rescue personnel will have been conducted no more than 12 months prior to the date of any entry they participate in. Rescue personnel will complete the training required for entrants, attendants, and supervisors, as described above. In addition, students will demonstrate proficiency in use of personal protective equipment and rescue equipment necessary to remove entrants from anticipated confined spaces. Mock rescue exercises utilizing dummies, mannequins, or actual persons will be conducted to ensure that rescue personnel are knowledgeable and proficient in conducting safe and effective rescues.

### **Records/Reports/Notification**

The original of the Confined Space Entry Permit must be available for review by employees during entry operations, forwarded to the SM or PM for review upon termination of the permit, and maintained in the project files upon completion of the manager's review.

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## **Attachment 1**

# WESTON CONFINED SPACE ENTRY PERMIT

## DESCRIPTION

LOCATION: \_\_\_\_\_

CLIENT: \_\_\_\_\_ WO#: \_\_\_\_\_

DESCRIPTION OF CONFINED SPACE: \_\_\_\_\_

DATE / TIME OF PERMIT ISSUE: \_\_\_\_\_ DATE / TIME OF EXPIRATION: \_\_\_\_\_

HAZARDS IDENTIFIED DURING INITIAL EVALUATION: \_\_\_\_\_

(Check One) ☐ PERMIT REQUIRED ☐ CONDITIONAL ENTRY ☐ NON-PERMIT ENTRY

## MEASURES USED TO ISOLATE SYSTEM AND PROTECT PERSONNEL

ITEM	YES	NO	N/A	ITEM	YES	NO	N/A
Space drained and cleaned as much as possible				Portable electrical tools grounded and safe condition			
All lines blanked or valves closed and locked out				Monitoring instruments calibrated and available			
Systems (electrical/mechanical/other) lockout, tagout protected				Communications available for entrants and attendants (specify)			
Space purged and ventilated to provide safe work conditions				Communications available for emergency assistance (specify)			
Area secure and posted				First aid kit available			
Respiratory protection required (if so, indicate type)				Rescue equipment available (specify)			
Level of Protection Appropriate (specify level)				Fire extinguisher available (specify)			
Low voltage or explosion-proof lighting provided (as necessary)				Welding/Cutting Permit required? Attach to CSE permit			
Tripod, mechanical hoist available and used							
Safety shower and eyewash available							
Attendant trained and properly equipped				Other:			
Rescue harness and lifelines available and used				Other:			

## PRECAUTIONS

	N/A	YES	NO
External Source Isolation (pumps, Lines, pipes blinded, blocked, or disconnected)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Forced Ventilation Required, fans, blowers operational.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Monitoring Instruments: CGI / O <sub>2</sub> monitor	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PID	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
FID	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Equipment: Communication -	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Harnesses, lifelines -	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hoist, tri-pod -	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Airlines, SCBAs -	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Protective clothing -	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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## ACTION LEVELS FOR THIS ENTRY

Condition	% Oxygen	Flammable (% LEL)	Toxics (organic)	Toxics (inorganic)	
Max. Concentration or Range	19.5 to 23.5	Less than 10 %			

## MONITORING AND TESTING RESULTS

Monitoring conducted by (print name): \_\_\_\_\_

Tests\Time						
Oxygen						
LEL						
OVA						
HNU						
Monitox						
Draeger						
Other						
Other						

## RESCUE AND EMERGENCY PHONE NUMBERS:

Fire Department: \_\_\_\_\_ Police Department: \_\_\_\_\_

Ambulance: \_\_\_\_\_ Medical: \_\_\_\_\_

Specify communications available and location: \_\_\_\_\_

## DOCUMENTATION

Entry team members (please print): \_\_\_\_\_

1.	6.
2.	7.
3.	8.
4.	9.
5.	10.

Confined Space Attendant (please print): \_\_\_\_\_

C. Permit reviewed and approved by Confined Space Entry Supervisor (print and sign, date and time):

\_\_\_\_\_/\_\_\_\_\_

D. Permit terminated by Confined Space Entry Supervisor (signature, date and time):

\_\_\_\_\_/\_\_\_\_\_

Reason for termination: \_\_\_\_\_

Comments: \_\_\_\_\_

*Note:* The original of this permit must be available during entry operations, forwarded to the Site Manager or Project Manager upon termination for review, and must be maintained in the project files upon completion.

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## GENERAL

## PROCEDURE

Improper lifting can result in cuts, pinches, crushing, and serious injury to back, abdomen, arm and leg muscles, and joints. Even relatively light objects, lifted improperly, can contribute to injury.

### Cuts, Pinching, and Crushing

Splinters, splinters, and sharp edges on objects to be lifted can result in cuts. Heavy objects can pinch or crush fingers, toes, arms, and legs between the object and nearby objects (e.g., walls, tables, counters, or railings).

### Muscle and Joint Injuries

Muscle and joint injuries occur when objects to be lifted are too heavy or awkward, are lifted improperly, or in areas where access is restricted.

Lifting tasks which are awkward and repetitive, even if involving only light objects, can lead to nerve and joint damage.

### Recognition and Hazard Assessment

The need for manual lifting must be identified as a physical hazard when project tasks specifically require manual handling or use of heavy equipment, and the following safe lifting techniques must be instituted:

- Plan any lifting task, noting:
  - **Contact hazards.** Check each object before lifting for presence of splinters, splinters, sharp edges or parts, cracks and loose joints, signs of biological hazards, and chemical or radioactive material contamination.
  - **Weight of object.** Unless involved in weight training, recommended safe lifting weights for an average man or woman are 50 and 35 pounds, respectively.
  - **Size and shape of object.** Large and oddly shaped objects are more difficult to lift, even within safe weight limits, due to imbalanced center of gravity.
  - **Area in which lifting is to be done.** Check for pinch points such as other objects close by and ensure there is room for safe lifting.
  - **Conditions under which lifting is to be accomplished.** Check for wet or slippery surfaces. Also consider level of protection to be used. Level B or A protection may add up to 40 lbs. To be lifted, as well as restricting range of motion and adding to area restriction by increasing bulk.

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- **Route to be traveled, if lifting includes carrying.** Check walking and working surfaces for slip and trip hazards, note ramps, changes in level of elevation, and ladders or stairways that need to be negotiated.

### **Prevention and Protection Programs**

- Before lifting, identify the potential for contact hazards on objects to be lifted. Check each object before lifting, remove any noted hazards as feasible, and wear gloves (cotton, at a minimum, or leather, kevlar, or chemical resistant material, depending on the nature of the hazard).
- Avoid contact with, or cover cracks or loose joints to reduce hazards of pinching.
- Workers must know their lifting limitations, plan before lifting, keep themselves in good physical condition, and get help if uncertain that they can lift safely. Managers must plan and allow for safe lifting.
- When lifting an object from the floor:
  - Determine that the object is within the safe weight limit.
  - Check for contact hazards.
  - Walk the intended route of travel to identify and remove slip and fall hazards.
  - Identify changes in elevation, steps, ramps, stairs and ladders that must be negotiated.
- To lift square or rectangular objects:
  - Avoid reaching as you lift.
  - Set feet firmly, placing one foot alongside the load and the other slightly behind the load.
  - Keep objects close to the body.
  - Squat in front of the load.
  - Grasp one of the top corners away from the body and the opposite bottom corner closest to the body.
  - Tilt the object slightly away from the body, tilt forward at the hips, keep the back straight and tuck in the chin.
  - Straighten the legs, keeping the spine straight, pull the object into the body and stand up slowly and evenly without jerking or twisting.
  - If turning or change of direction is required, turn with feet without twisting the torso and step in the direction of travel

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- To set an object down, reverse the sequence, being sure not to trap the bottom hand between the object and the surface on which the object is set.

Workers must be trained and have the opportunity to use the above steps with lighter objects before performing heavy lifting. **For odd-shaped objects, the only modification needed should be hand-hold position.** When two or more persons are lifting, have a plan and a set of signals so lifting occurs simultaneously.

Do not carry objects in a manner which obstructs vision in the line of travel.

Carry objects so one hand is free to hold the handrail on stairs and that there is an unobstructed view of footing. Carry objects in a manner to permit use of both hands while climbing a ladder.

## **Manual Handling of Heavy Objects**

### **Hazard**

Manual maneuvering or handling of heavy objects without actually lifting is often required for hazardous materials and on Resource Conservation and Recovery Act (RCRA) facilities and construction sites. Manual handling of heavy objects, even when not actually lifting, can pose the same hazards as lifting including cuts, pinches, bruises, crushing, muscle and joint strain, and contact with hazardous materials and biological hazards.

### **Recognition and Risk Assessment**

The need for manual handling of heavy objects must be addressed in the planning stages of a project Health and Safety Plan (HASP). Drums and other containers which must be maneuvered for access to information or sampling locations, that are inaccessible to mechanical handling equipment, require manual handling and special precautions. When handling of heavy objects does not actually involve lifting, workers can handle heavier objects, even those weighing several hundred pounds, safely if proper techniques are used. In many instances, the procedures involve balancing and taking advantage of the shape of the object.

### **Prevention and Protection Programs**

Prior to performing manual handling, it must be determined that it can be done safely and that mechanical assistance is infeasible.

Mechanical equipment or assistance such as dollies, carts, come-alongs or rollers are to be used whenever possible. Mechanical assistance must be of proper size, have wheels sized for the terrain, and be designed to prevent pinching or undue stress on wrists. Objects to be moved must be secured to prevent falling and properly balanced to prevent tipping.

The minimum protection for manual handling is heavy cotton or leather gloves, safety boots, and coveralls. Metatarsal guards, chemical protective clothing, and metal mesh or kevlar gloves must be used as risk increases of heavy items falling, hazardous materials contact and sharp edges, splinters or slivers.

Workers must be aware of and work within their weight-handling capabilities.

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Objects to be manually handled must be checked for contact hazards prior to beginning movement, and to ensure handling will not trap hands, arms, legs, or feet between the object and other objects, walls, or railings.

Properly trained personnel may roll heavy objects with a round base such as 55 gallon drums or compressed gas cylinders, if rolling will not damage the structural integrity. Rolling must be controlled by chutes, tag-lines, or other means of limiting acceleration. Use of the legs for pushing and tag-line control of rolled objects must be stressed.

Only properly trained personnel may move cylindrical objects which must remain upright by hand. Cylindrical objects, such as drums that must remain upright, are handled manually by slightly tilting the object, using the legs for control, and balancing the object on the bottom edge. The handler then walks beside the object, with the object tilted toward the body, positioning the hands on the top edge away from the body and moving so they do not cross, thus maintaining balance and a steady controlled forward motion.

Prior to moving cylindrical objects in this way, the route of travel must be walked to identify any changes of elevation, pot holes, or other obstructions that could cause the object to snag, tip, or get out of control.

Flat, square, or rectangular objects are most easily handled using make-shift rollers or skids to break the friction with the resting surface and pushing, using the legs.

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## **FLD 11      ROUGH TERRAIN**

### **GENERAL**

### **REFERENCES**

Related FLD OPS:

*FLD02 – Inclement Weather*

*FLD05-Heat Stress*

*FLD06-Cold Stress*

*FLD15 – Remote Areas*

*FLD22-Heavy Equipment Operation*

*FLD47-Clearing and Grubbing*

### **Hazard**

Physical hazards associated with rough terrain include vehicle accidents, heavy equipment incidents, falling, slipping, and tripping. Driving vehicles on uneven surfaces creates a possibility of the vehicle rolling, getting stuck in mud or ditches, or of an accident due to flat tires or striking obstacles and other vehicles. Heavy or downed vegetation can hide holes or breaks in the terrain, which increase risk of slips, trips, and falls or vehicle accidents.

### **Recognition and Risk Assessment**

Rough terrain complicates work activities and adds or increases risk. In the planning stages of a project, rough terrain must be considered as a physical hazard. Risk assessment is usually accomplished from site history information (i.e., site topography) and onsite by the Site Health and Safety Coordinator (SHSC).

### **Hazard Prevention and Protection Programs**

Hazard prevention can be achieved by ensuring regular maintenance is performed on vehicles. In order to minimize accidents, site surveillance on foot may be required to ensure clear driving paths. The site crew should be alert and observe terrain while walking to minimize slips, trips, and falls. Boots that are ankle high or higher should be worn to provide additional support and stability. Vehicle drivers and passengers should wear seatbelts at all times. 4 wheel drive vehicles should be used if terrain conditions are wet, frozen, broken, or otherwise deemed unsafe for 2 wheel drive vehicles by the SHSC.

When clearing and grubbing activities are being conducted, the equipment operator is to protected by a fully enclosed cab. Chainsaw operators are to wear chaps, hardhat, face/ear and eye protection. Ground personnel should always be alert for snakes and wild animals.

Personnel should maintain a high level of physical conditioning due to increased body stress and exertion. Emergency communications such as a cell phone or two-way radio should be carried at all times. Personnel should be aware of potential hazards and ensure the availability of first aid supplies and knowledge of the location of the nearest medical assistance.

## GENERAL

Hazards associated with poor housekeeping include slips, trips, falls, punctures, cuts, and fires.

## REFERENCES

Related FLD OPS:

*FLD29 – Material Handling*

*FLD33 – Demolition*

*FLD39 – Illumination*

## PROCEDURE

### Recognition and Risk Assessment

Good housekeeping is an important element of accident prevention. Good housekeeping should be planned at the beginning of the job and carefully supervised and monitored through to the final clean-up.

Housekeeping requirements must be addressed in the planning stages of a project and safety plan. Risk assessment can be accomplished in the development stages of a project by listing in the site-specific Health and Safety Plan (HASP), good housekeeping requirements and the hazards associated with poor housekeeping (e.g., slips, trips and falls). The SHSC must make decisions on the proper safety procedures and recommend them to the site manager. Each worker must evaluate the risk associated with his or her work and be actively alert to these hazards. Any site worker may stop work if safety procedures are not followed or the risk is too great.

### Prevention and Protection Programs

Poor housekeeping can be prevented by following the three steps described below:

1. Plan ahead. A materials storage area which has been planned is more orderly than one which has developed haphazardly.
2. Assign responsibilities. If the size of the job and work force merit, a person should be assigned specific responsibility for clean up. Ideally, each individual should pick up his or her work area and help keep the site neat.
3. Implement the program. Housekeeping must be part of the daily routine, with clean-up being a continuous procedure.

Accidents caused by poor housekeeping can be prevented by adherence to the following rules.

Lunch areas should be kept clear of empty bottles, containers, and papers. Trash disposal cans should be provided. An effective means of preventing litter is the provision of suitable receptacles for hazardous waste, as well as nonhazardous waste.

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Accumulation of flammable and combustible liquids on floors, walls, and other areas, is prohibited. All spills of flammable and combustible liquids must be cleaned up immediately. Combustible waste such as soiled rags and paper is to be stored in a safe place (such as a covered metal container) and disposed of regularly.

WESTON project managers and WESTON subcontractors should provide sufficient personnel and equipment to ensure compliance with all housekeeping requirements.

Work will not be allowed in areas that do not comply with the requirements of this section.

The SHSC and WESTON subcontractors will inspect the work area daily for adequate housekeeping and record unsatisfactory findings on the daily inspection report.

If applicable, the decontamination line must be kept neat and free of debris.

Adequate lighting should be provided in or around all work areas, passageways, stairs, ladders, and other areas used by personnel.

All stairways, passageways, gangways, and accessways shall be kept free of materials, supplies, and obstructions at all times.

Loose or light material should not be stored or left on roofs or floors that are not enclosed, unless it is safely secured.

Tools, materials, extension cords, hoses, or debris are to be used, disposed of, and stored so as not to cause a tripping or other hazard.

Tools, materials, and equipment subject to displacement or falling should be adequately secured.

Empty bags that contained lime, cement, and other dust-producing materials should be removed periodically, as specified by the designated authority.

Protruding nails in scrap boards, planks, and timbers should be removed, hammered in, or bent over flush with the wood, unless placed in containers or trucks for removal.

Walkways, runways, and sidewalks should be kept clear of excavated material or other obstructions and no sidewalks should be undermined unless shored to carry a minimum live load of 125 pounds per square foot.

Containers should be provided for storing or carrying rivets, bolts, and drift pins, and secured against accidental displacement when aloft.

When rivet heads are knocked off or backed out, they should be prevented from falling.

Form and scrap lumber and debris should be cleared from work areas, passageways, and stairs in and around building storage yards and other structures.

All storage and construction sites should be kept free of the accumulation of combustible materials.

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All materials should be maintained in neat stockpiles for ease of access. Aisles and walkways should be kept clear of loose materials and tools.

Areas prone to weeds and grass should be kept mowed. A standard procedure should be established for cleanup of such areas, as specified by the SHSC.

Rubbish, brush, long grass, or other combustible material must be kept from areas where flammable and combustible liquids are stored, handled, or processed.

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## **FLD 14      SITE SECURITY**

### **GENERAL**

### **REFERENCES**

Related FLD OPS:

*FLD15 – Remote Areas*

*FLD39 – Illumination*

### **PROCEDURE**

When WESTON's responsibilities include site control or security as in WESTON Office locations, one aspect of the Site Health and Safety Plans and Business Continuity Plan Emergency Action Plans to be addressed is security, or maintaining control of access to the site. Contingency plans are required to deal with unauthorized entry. Inquisitive and/or hostile persons may interfere with the site activities or work effort, jeopardizing their safety, as well as the safety of the field team.

#### **Recognition and Risk Assessment**

In the planning stages of a project and safety plan, the potential for security problems must be considered as physical hazards in the site-specific Health and Safety Plan (HASP). Risk assessment can be accomplished in the development stages of a project by listing in the HASP the most likely security problems that may be encountered. The Site Health and Safety Coordinator (SHSC) must make decisions on the proper safety procedures and recommend them to the site manager. Each worker must evaluate the risk associated with his or her work and be actively alert to these hazards. Any site worker may stop work if safety procedures are not followed or the risk is too great.

Entry to a site by unauthorized persons presents risks to the persons entering and to WESTON personnel who may have to interact with such individuals. In many cases, the unauthorized entry is accidental or unintentional; however, contingency plans must also include procedures for instances when unauthorized entry is deliberate or for purposes which could pose a threat to site personnel.

During the assessment of risk for each site, security problems must be identified. The contingency plan should identify ways to prevent and respond to security problems.

Security problems may arise from the site neighborhood due to:

- Socio-economic factors
- Client/neighbor relations
- Client/labor relations
- Poor lighting
- Remoteness and size of site
- Value of equipment and materials
- Sampling equipment tampering

## **Prevention and Protection Program**

Prevention programs are an integral portion of a Security Plan for Business Continuity and Emergency Action Plans or Contingency Plans for Site Health and Safety Plans. An effective preventative measure is to inform all interested parties of the site activities. An attempt should be made to notify state and local police, the fire department, and any local/state government officials of the project's purpose and scope. This will allow those authorities to answer questions posed to them by local residents and the media by preparing statements on the project's purpose or by informing the public where to call for further information. This will alleviate the problem of work stoppage due to field personnel answering questions.

One must ensure that the client understands and approves of any information released. In most cases, the liaison should be between the client and the public.

The Security Contingency Plan must:

- Identify the person responsible for implementing the Contingency Plan
- State as the first priority the safety of WESTON personnel
- Be designed to minimize the potential for confrontation and to obtain security assistance as quickly as possible
- Assign the enforcement of security functions to properly trained and authorized or bonded agencies
- Establish a communication procedure for obtaining assistance
- Be communicated to site personnel

Security Problem Prevention measures include:

- Community relations programs
- Visible security precautions (e.g., fences, "keep out" signs)
- Locking doors that are unattended during working hours and all doors during non-working hours
- Carefully defined rules/requirements for authorizing site access
- Clearly delineated access points and barriers around work area
- Vigilance by all site personnel
- Adequate lighting
- Working in pairs or teams in sensitive areas
- Locking and storing equipment securely
- Using discretion in discussions and conversations when off-site
- Working to avoid confrontation

In short, security prevention includes not advertising activities or inviting intrusion. Telephone numbers and instructions for obtaining security assistance must be clearly posted onsite.



Personnel onsite must always have access to communications. These communications may be to additional onsite personnel or, in certain situations, communications by team members to outside response agencies may be necessary.

### **Workplace Violence**

Workplace violence has become an unfortunate concern for any employer and employee. Workplace violence has proven to have little regard for location or status of the workplace. The information provided in Appendix A is considered guidance for developing awareness and violence prevention programs. The key to preventing workplace violence is to develop an objective awareness of all aspects of our work environment including the people within it.

#### **Terrorism**

Terrorist events in recent years have added the need to ensure Emergency Action Plans address Bomb threats and precautions to reduce the potential for terrorist activities.

#### **Bomb Threats**

WESTON's association with environmental issues have led to past experiences where local elements have identified WESTON with regulators and have threatened violence against WESTON personnel or property.

Precautions to be taken include those listed above under general site security and the following:

- Ensure that site and office personnel are made aware when WESTON activities increase the potential for work place violence,
- Use care in discussing involvement in Department of Defense, Department of Energy or other politically or socially sensitive issues out side of work,
- Train persons receiving and handling mail and deliveries in what to look for as potential for inflicting violence on a WESTON person or workplace. Examples include:
  - Misspelled words
  - Hand written addresses
  - Mail from foreign countries
  - Excessive tape or postage
  - Restrictive markings (e.g., Confidential)
  - No return address

Emergency Action Plans must identify procedures to be taken if suspicious packages are received.

**APPENDIX A**

**WESTON SOLUTIONS, INC.**

**VIOLENCE-FREE WORKPLACE GUIDANCE**

# **WESTON SOLUTIONS, INC.**

## **VIOLENCE-FREE WORKPLACE GUIDANCE**

### **1. PURPOSE**

Weston Solutions, Inc. (WESTON) is committed to providing a safe workplace and high standards of health and safety for employees. Consistent with this commitment, the Company establishes this Violence-Free Workplace Guidance Document to define its zero-tolerance policy regarding workplace violence and to describe the programs that will support that policy.

### **2. POLICY**

It is WESTON's policy that violence will not be tolerated from any WESTON employee whether at or away from any work area, activity, or function. All reasonable and legal steps will be taken by WESTON staff and managers in the performance of their daily work activities to ensure that harassing, intimidating, threatening, or assaulting behaviors are avoided or prevented, and if observed are appropriately addressed. Any such behavior by a WESTON employee will be investigated and disciplinary action will be swift and severe if violent behavior is verified.

This policy applies also to threats or acts of violence perpetrated on WESTON work sites by non-WESTON personnel. WESTON employees will report instances of such behavior to their supervisors, and supervisors will take appropriate actions to protect potential victims and report improper behavior to the authorities.

### **3. TRAINING**

There are no regulatory requirements for training on the topic of preventing workplace violence, and this Guidance Document does not impose strict requirements for training employees on the topic. However, information regarding prevention of workplace violence will be disseminated as part of standard employee training sessions such as new employee indoctrination, management skills training, and refresher training for field staff. In addition, short training sessions ("brown-bag" courses) will occasionally include the information in this GUIDANCE and related topics such as protection against violent acts such as robbery, car jacking, and road rage, identifying situations that increase the likelihood of violence, and recognizing warning signs that predict violent behavior.

## Indicators that may signal the risk potential of violent episodes

The risk of workplace violence can be minimized by the careful observation of behavior. Specific stress factors, behaviors, and personality traits have been associated, after the fact, with almost every incident of workplace violence. The presence of several of these indicators greatly increases the likelihood of violent actions. Most people will not just "snap". An escalating series of clues usually precedes an act of workplace violence. The risk of a violent outburst is greatly increased when a combination of the following warning signs are ignored.

- **Boundary crossing** includes pushing the limits of acceptable workplace behavior and continual testing of established rules. **Chemical dependence** upon alcohol and/or drugs may agitate or create paranoia and aggressive behavior.
- **Concentration problems** such as difficulty recalling instructions, forgetfulness, repetition of errors, and staring into space indicate a troubled employee.
- **Depression** causes nearly one in seven sufferers to commit a violent act either upon themselves or others. Symptoms of depression include; despair, ambivalence, slowed work pace, continual sad or blank facial expressions, withdrawal, self-condemnation and self-destructive behavior, hopelessness, helplessness, inappropriate guilt/shame, and poor personal hygiene.
- **History of violence**, including domestic abuse, is the best predictor of violent behavior.
- **Inconsistent work patterns and attendance problems** include periods of very high and very low productivity as well as unexplained or improbable excuses for absences.
- **Obsessive interest in weapons and violent incidents** may be revealed in casual conversations.. An obsession with an impending apocalypse, or destruction of the world, is also common among unstable individuals.
- **Obsession with job** may cause a deeper sense of loss in the case of a poor performance review or termination. These individuals may be loners, having little else of importance in their lives.
- **Pathological "blamers"** cannot take responsibility for their own actions. They will not admit wrongdoing, even for minor mistakes, always blaming other people, the organization, or the system.
- **Personality disorders** can result in antisocial behavior such as repeated fighting and domestic violence. These individuals have little remorse about wrongdoing and will find ways to justify their violent behavior. Mood shifts, inappropriate anger, skillful manipulation of others, and preoccupation with self are indicators of personality disorder.
- **Personal stress** can result in excessive personal phone calls, desk pounding or throwing of objects, crying, lapses in attention, and general frustration with the surrounding environment. Debt, separation, divorce, or the death of a relative can all cause excessive stress.
- A pattern of **Poor interpersonal relationships** may result in belligerence, overreaction to criticism, and verbal harassment.
- **Psychosis** is a loss of contact with reality which may be manifested as paranoia, loss of association during conversations, flat facial expressions, extreme ambivalence, hallucinations, poor insight, talking to self, or bizarre delusions.
- **Romantic obsession** is a fixation upon and idealized romantic love for another person. Behavioral signs may include stalking, numerous phone calls, spying, and unwanted visits and gifts.
- **Safety issues** like recklessness and a sudden increase in accident rate reveal lapses in concentration and disregard for personal/coworker safety.

- **Unusual/changed behavior** includes verbal outbursts, inappropriate remarks, and threats such as "they'll regret this". A series of escalating threats is a particularly important indicator of the potential violent actions.
- **Paranoia** - irrational thoughts of being "Set-up"

If an employee begins demonstrating any or a combination of the above indicators, it is important that management is informed and consults with the Manager of Human Resources to refer him or her to the Employee Assistance Program (EAP) or other counseling services as appropriate. It is imperative to respond in an empathic, caring and non-shaming manner, remembering that time is of the essence.

Oftentimes, violence in the workplace is committed by someone from outside a company. Therefore, when possible, it is important to have surveillance at the entrance of the office location or control using secured access. The following situations indicate a potential threat:

- The spouse or partner of an employee who is in an abusive relationship
- Rejected suitors, partners involved in divorce or separation procedures
- Ex-employees who have been fired or laid off
- Disgruntled customers
- Person committing armed robbery
- Persons involved in gang activities

### **Types of workplace violence and their characteristics**

Workplace violence occurs in a variety of forms. These "types" are violence by strangers, violence by customers or clients, violence by co-workers, and violence by personal relationships. These types of workplace violence and their specific characteristics are described below:

**Type 1: Violence by strangers** -- involves verbal threats, threatening behavior or physical assaults by an assailant who has no legitimate business relationship to the workplace. The person enters the affected workplace to commit a robbery or criminal act. Violence by strangers is responsible for the majority of fatal injuries related to workplace violence nationally. Workplaces at risk of violence by strangers commonly include late-night retail establishments and taxi cabs.

**Type 2: Violence by presumably affected parties** -- involves verbal threats, threatening behavior or physical assaults by an assailant who either receives services from or is under the custodial supervision of the affected workplace or the victim. Assailants may have known or perceived claims against a client or stakeholder in a project or in the case of a labor dispute with WESTON or a subcontractor. .

**Type 3: Violence by co-workers** -- involves verbal threats, threatening behavior or physical assaults by an assailant who has some employment related involvement with the workplace—a current or former employee, supervisor or manager, for example. Any workplace can be at risk of violence by a co-worker. In committing a threat or assault, the individual may be seeking revenge for what is perceived as unfair treatment. This type of violence accounts for a much smaller proportion of the fatal workplace injuries than violence by strangers.

**Type 4: Violence by personal relations** -- involves verbal threats, threatening behavior or physical assaults by an assailant who, in the workplace, confronts an individual with whom he or she has or had a personal relationship outside of work. Personal relations include a current or former spouse, lover,

relative, friend or acquaintance. The assailant's actions are motivated by perceived difficulties in the relationship or by psycho-social factors that are specific to the assailant.

#### **4. REQUIREMENTS**

Violent behavior is considered indicative of personality characteristics that WESTON chooses to avoid in new hires and employees. As a result, WESTON may not hire individuals who have been convicted of violent activities. WESTON managers will verify the result of any background checks, references, or referrals and will carefully weigh any evidence of past violent actions in their consideration of candidates for hire.

WESTON will train its managers to recognize violent actions and tendencies, and requires that they investigate and respond in a timely and appropriate manner to any reported acts of violence by an employee. Managers shall consult with the Headquarters Managers of Human Resources and Environmental Health and Safety as necessary to determine an appropriate course of action. In addition, managers will be trained to recognize potentially inflammatory situations and handle them in ways that will not encourage violent behavior.

Employees are prohibited from bringing weapons that are clearly not required for the performance of work duties, such as firearms, onto work premises, including parking lots. WESTON reserves the right to inspect and search any item on the company's premises, including personal vehicles that are present in parking lots at any company work site. Employees may not consider any personal item brought to the workplace as exempt from search and inspection procedures.

Former employees and off-duty employees are prohibited from entering WESTON work areas unless required in the course of normal business activities and approved by a WESTON manager.

Disciplinary actions for workplace violence may range from counseling an employee to immediate termination of employment with WESTON. The latter may be enacted in cases of flagrant acts of physical violence and other cases warranting such action as determined by the Managers of Human Resources and Corporate Environmental Health and Safety.

Employees are encouraged to report any concerns or observations including threats, harassment, physical attacks, and domestic problems that may affect work performance to their supervisors. Supervisors will take appropriate measures to address violent acts by workers and to prepare for potential consequences at work that may result from domestic problems reported by employees.

Emergency action plans as part of each office's business continuity must address workplace security and actions to avoid and react to workplace violence

**GENERAL**

**REFERENCES**

Related FLD OPS:

*FLD05 – Heat Stress Prevention and Monitoring*

*FLD06 – Cold Stress*

*FLD10 – Manual Lifting of Heavy Objects*

*FLD11 – Rough Terrain*

*FLD13 – Structural Integrity*

*FLD34 – Utilities*

**PROCEDURE**

Hazards associated with remote areas include the following.

- Exposure to irritant and toxic plants such as poison ivy and thorny plants may cause allergic reactions.
- Surfaces covered with heavy vegetation and undergrowth present tripping and falling hazards due to holes or depressions that are not easily visible.
- Back strain due to carrying instruments or equipment.
- Native wildlife such as rodents, ticks, and snakes present the possibility of bites and associated diseases, such as Lyme disease.
- Driving vehicles on uneven or unsafe surfaces can result in accidents such as overturned vehicles or flat tires.
- Structurally unsound buildings pose overhead hazards.
- Limited access to medical assistance.
- Heat stress/cold stress exposure.

**Recognition and Risk Assessment**

Remote areas complicate work activities and add or increase risks. In the planning stages of a project, physical hazards associated with remote areas must be considered. Risk assessment is usually accomplished onsite by the Site Health and Safety Coordinator (SHSC) and by evaluating site history information.

## **Prevention and Protection Program**

The following protective protocols reduce accidents at remote areas.

- Wear long-sleeved clothing and slacks to minimize contact with irritant and toxic plants and to protect against insect bites. Provide appropriate first aid for personnel with known allergic reactions.
- Be alert and observe terrain while walking to minimize slips and falls. Wear ankle-high (or higher) boots for increased traction, support, and stability.
- Use proper lifting techniques to prevent back strain.
- Avoid wildlife when possible. In case of an animal bite, perform first aid and capture the animal, if possible, for rabies testing. Perform a tick check after leaving a wooded or vegetated area.
- Ensure all maintenance is performed on vehicles before going to the field. Proper vehicle maintenance will prevent avoidable vehicle breakdown in the field. In order to minimize accidents from uneven terrain, a site surveillance should be performed on foot to select a clear driving path. Seat belts should be worn at all times.
- Inform office personnel of location and estimated return time.
- Maintain an adequate and fully stocked first aid kit.
- Maintain communications capability.
- Maintain adequate supplies of drinking water and food.
- Keep a current map of the work area.
- Avoid buildings that are not structurally sound.
- Implement heat and/or cold stress management techniques such as shifting work hours, fluid intake, and monitoring employees, especially high-risk workers.

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## **GENERAL**

## **REFERENCES**

Related FLD OPS:

*FLD01 – Noise Protection*

*FLD02 – Inclement Weather*

## **PROCEDURE**

Traffic presents hazards in two ways: 1) when site workers are working close to roadways, the potential exists to be hit by oncoming traffic, and 2) driving to, from, and on the site poses a potential accident hazard.

### **Recognition and Risk Assessment**

In the planning stages of a project and safety plan, the potential for traffic hazards must be considered as physical hazards in the site-specific Health and Safety Plan (HASP). Risk assessment can be accomplished in the development stages of a project by listing in the HASP the most likely traffic hazards that may occur. The SHSC must make decisions on the proper safety procedures and recommend them to the Site manager. Each worker must evaluate the risk associated with his or her work and be actively alert to these hazards. Any site worker may stop work if safety procedures are not followed or the risk is too great.

### **Prevention and Protection Program**

#### **Roadway Workers**

Roadway workers should be aware of their location in reference to roadways and avoid working close to traffic. Workers near roadways must wear reflective vests.

The following guidance should be used in planning work that will be adjacent to or within roadways. In all cases, the local police department or transportation department must be consulted in order to comply with applicable requirements.

When open highway conditions prevail on approach to the work site, advance warning signs should be placed approximately 1500 feet in advance of the condition to which they are calling attention. Where a series of advance warning signs are used, the warning signs nearest the work site should be placed approximately 500 feet from the point of restriction, with additional signs at 500- to 1000-foot intervals. On expressway and limited access facilities, the advance warning distance should be increased to one-half mile or more; on city streets, where more restrictive conditions generally prevail, advanced warning should appear on the approach to the work area. Signs in the immediate vicinity of the work may be placed at closer spacings.

Flag persons may be required to control the speed of nearby traffic. Lights should be provided to mark flag person stations and barricading at night. Barricading is extended to the point where it is visible to approaching traffic.

Signs on fixed supports are usually mounted on a single post, although those wider than 36 inches or larger than 10 square feet in area should generally be mounted on two posts. Signs mounted on portable supports are suitable for temporary conditions.

## **Drivers**

All drivers will be licensed, regardless of whether they are operating on or off public highways. A government driver's license is required for WESTON employees and WESTON subcontractors if a government vehicle will be used.

If drivers are operating across state lines, they should be familiar with laws governing traffic in states in which they will operate. All traffic rules and regulations, and all traffic control signs and devices should be obeyed. All operators are required to stay within posted speed limits at all times.

Drivers are required to make a daily inspection of their vehicles. The check should include steering, brakes, mirrors, lights, horn, tires, and windshield wipers. Any special safety items, such as back-up alarms, should also be checked to ensure safe operation. Drivers should be required to report all defects, and repairs should be made promptly.

Drivers should make a visual check around the vehicle to ensure no objects and personnel are in the vehicle's path before moving the vehicle.

Drivers should become familiar with all controls before operating an unfamiliar vehicle.

Drivers should operate vehicles defensively and exercise special care when driving on unfamiliar roads, at night, and in inclement weather.

Drivers should give pedestrians the right of way.

Off-highway operation may require extra precautions to prevent shifting of load when crossing rough terrain.

Trucks should be backed under the direction of a signal person if the operator does not have a clear view of the area to the rear of the vehicle.

Windshields, rear-view mirrors, and lights should be kept clean.

Based upon the size of the vehicle, or if specific quantities of hazardous materials are transported, the driver may be required to have a Commercial Driver's License (CDL). Refer to The Motor Vehicle Operating Practice.

## **Transporting Personnel**

The SHSC will ensure that seat belts are installed and functional on all vehicles used by WESTON personnel and WESTON subcontractors, and that all passengers use them. The use of seat belts by all personnel is mandatory.

Some convenient means of mounting and dismounting the truck should be provided.

Personnel should be required to ride within the space provided, never on running boards, fenders, bumpers, or atop cabs.

Adequate wind protection should be provided for long distance trips, and during cold weather.

Personnel are not allowed to ride on the outside or back (such as in the bed of a pickup truck) of vehicles.

## **Transporting Materials**

Materials loaded should be within the safe weight limit for the truck, and should not project beyond the truck body.

While being loaded, truck wheels should be properly blocked.

Trucks operated on public highways should conform to weight and clearance limitations of bridges, powerlines, overhead structures, and other restrictions.

No person should be permitted to remain in or on a truck being loaded by excavating equipment or cranes unless the cab is adequately protected against impact.

## **Pedestrian Protection Program**

Pedestrians on-site should use discretion when crossing the streets or working near traffic. Pedestrians should use sidewalks whenever possible and not step from curbs unless vehicles are at a safe distance.

## **Vehicle Maintenance**

Operators should immediately report any damage or failure of parts and accessories to the SHSC. It is advantageous to have road flares, fire extinguishers, and other safety equipment on the vehicle at all times.

Vehicles should not be fueled from open cans or by other makeshift methods, as there is great danger of flash fire from hot engines.

Engines should be shut off while fueling.

Revised 11 1999

## **FLD 22      EARTH MOVING EQUIPMENT/ MATERIAL HANDLING EQUIPMENT.**

### **REFERENCES**

*CFR 1926 Paragraphs 600-602*

Related FLD OPS:

*FLD23 – Cranes/Lifting Equipment*

*FLD24 – Aerial Lifts/Manlifts*

*FLD34 – Utilities*

*FLD35 – Electrical Safety*

### **PROCEDURE**

These rules apply to the following types of earthmoving equipment: scrapers, loaders, crawler or wheel tractors, bulldozers, off-highway trucks, graders, agricultural and industrial tractors, and similar equipment.

#### **Machinery and Mechanized Equipment Safety**

Before any machinery or mechanized equipment is placed in use, it will be inspected and tested by a competent mechanic and certified to be in safe operating condition.

The employer will designate a competent person to be responsible for the inspection of all machinery and equipment daily and during use to make sure it is in safe operating condition. Tests will be made at the beginning of each shift during which the equipment is to be used to determine that the brakes and operating systems are in proper working condition.

Preventative maintenance procedures recommended by the manufacturer will be followed.

Any machinery or equipment found to be unsafe shall be removed from service and its use prohibited until unsafe conditions have been repaired or corrected.

Inspections or determinations of road conditions and structures will be made in advance to ensure that clearances and load capacities are safe for the passing or placement of any machinery or equipment.

Machinery and mechanized equipment will be operated only by designated personnel. Equipment deficiencies observed at any time that affect safe operation will be corrected before continuing operation.

Seat belts shall be provided on all equipment covered by this section and shall meet the requirements of the Society of Automotive Engineers, J386-1969, Seat Belts for Construction Equipment. Seat belts for agricultural and light industrial tractors shall meet the seat belt requirements of Society of Automotive Engineers J333a-1970, Operator Protection for Agricultural and Light Industrial Tractors.

Seat belts shall be worn when provided by manufacture. . Passengers shall not be allowed to ride on equipment unless equipment designed with additional seats with safety belts.

Audible alarms. All bi-directional machines, such as rollers, compacters, front-end loaders, bulldozers, and similar equipment, shall be equipped with a horn, distinguishable from the surrounding noise level, which shall be operated as needed when the machine is moving in either direction. The horn shall be maintained in an operative condition.

Getting off or on any equipment while it is in motion is prohibited.

Machinery or equipment requiring an operator will not be permitted to run unattended.

Machinery or equipment will not be operated in a manner that will endanger persons or property, nor will the safe operating speeds or loads be exceeded

All machinery or equipment will be shut down and positive means taken to prevent its operation while repairs or manual lubrications are being done. The only exemption is equipment designed to be serviced or maintained while running.

All repairs on machinery or equipment will be made at a location that will provide protection from traffic or other hazards to maintenance personnel.

Machinery and equipment, or parts thereof, that are suspended or held apart by slings, hoists, or jacks also will be substantially blocked or cribbed before personnel are permitted to work underneath or between them.

Bulldozer and scraper blades, front end-loader buckets, dump bodies, and similar equipment will be either fully lowered or blocked when being repaired or when not in use. All controls will be in a neutral position, with the engines stopped and brakes set, unless work being performed on the machine requires otherwise.

Stationary machinery and equipment will be placed on a firm foundation and secured before being operated.

All points requiring lubrication during operation will have fittings so located or guarded to be accessible without hazardous exposure.

When necessary, all mobile equipment and the operating area will be adequately illuminated while work is in progress.

Mechanized equipment will be shut down prior to and during fueling operations. Closed systems, with automatic shutoff that will prevent spillage if connections are broken, may be used to fuel diesel powered equipment left running.

All towing devices used on any combinations of equipment will be securely mounted and structurally adequate for the weight drawn.

Persons will not be permitted to get between a piece of towing equipment and the item being towed until the towing equipment has come to a complete stop.

All equipment with windshields will be equipped with powered wipers. Vehicles that operate under conditions that cause fogging or frosting of windshields will be equipped with operable defogging or defrosting devices.

All equipment left unattended at night, adjacent to a highway in normal use, or adjacent to construction areas where work is in progress, will have lights or reflectors, or barricades equipped with lights or reflectors, to identify the location of the equipment.

Whenever the equipment is parked, the parking brake will be set. Equipment parked on inclines will have the wheels chocked or track mechanism blocked and the parking brake set. Equipment such as lift trucks and stackers will have the rated capacity posted on the vehicle so as to be clearly visible to the operator. When auxiliary removable counterweights are provided by the manufacturer, corresponding alternate rated capacities also will be clearly shown on the vehicle. The ratings will not be exceeded.

Steering or spinner knobs will not be attached to the steering wheel unless the steering mechanism prevents road reactions from causing the steering hand wheel to spin. When permitted, the steering knob will be mounted within the periphery of the wheel.

All industrial trucks in use will meet the requirements of design, construction, stability, inspection, testing, maintenance, and operation, defined in American National Standards Institute (ANSI) B56.1, Safety Standards for Powered Industrial Trucks.

The installation of live booms on material and personnel hoists is prohibited.

The controls of loaders, excavators, or similar equipment with folding booms or lift arms will not be operated from a ground position unless so designed.

Personnel will not work or pass under the buckets or booms of loaders in operation.

Cranes and any other equipment used for lifting must be inspected as required and records of inspection must be maintained.

### **Drill Rigs**

WESTON has adopted the Drilling Safety Guide prepared by the Diamond Core Drilling Manufacturers Association and the National Drilling Contractors Association, as published by the National Drilling Federation, as the basic safety programs for all activities involving drill rigs or similar apparatus for the purpose of well installation or soil borings.

## **FLD 23      CRANES/ RIGGING/SLINGS**

### **GENERAL**

### **REFERENCES**

Related FLD OPS:

*FLD22 – Heavy Equipment Operation – General*

*FLD24 – Aerial Lifts/Manlifts*

*FLD25- Fall Protection*

### **PROCEDURE**

Any piece of equipment used for lifting materials or personnel shall be used and maintained in strict accordance with manufacturer's directions and applicable Occupational Safety and Health Administration (OSHA) regulations.

Load limits will be visibly posted on all lifting devices.

Only operators with demonstrated competence shall be permitted to operate lifting devices.

Lifting machinery and all elements of equipment involved in lifting or supporting loads must be inspected prior to use and at a minimum monthly. Inspections must be performed by a competent person and must be documented.

Prior to any lift the Crane Contractor shall provide copies of operator qualifications and inspections for the crane that shall be used for the lift. Operator shall provide operating manual, load rating chart for the crane to be used (crane make & model), and the crane's log book of operations.

A Critical Lift Plan shall be developed by a Qualified Person for the item to be lifted. The plan shall specify weight, size, geometry, height, rigging plan and lift points for the item to be lifted.

The employer shall comply with the manufacturer's specifications and limitations applicable to the operation of any and all cranes and derricks. Where manufacturer's specifications are not available, the limitations assigned to the equipment shall be based on the determinations of a qualified engineer competent in this field and such determinations will be appropriately documented and recorded. Attachments used with cranes shall not exceed the capacity, rating, or scope recommended by the manufacturer.

Rated load capacities, and recommended operating speeds, special hazard warnings, or instruction, shall be conspicuously posted on all equipment. Instructions or warnings shall be visible to the operator while he is at his control station.

Hand signals to crane operators shall be those prescribed by the applicable ANSI standard for the type of crane in use. An illustration of the signals shall be posted at the job site.

Weston shall designate a competent person who shall inspect all machinery and equipment prior to each use, and during use, to make sure it is in safe operating condition. Any deficiencies shall be repaired, or defective parts replaced, before continued use.

A thorough, annual inspection of the hoisting machinery shall be made by a competent person. The Crane Owner shall maintain a record of the dates and results of inspections for each hoisting machine and piece of equipment.

Wire rope shall be taken out of service when any of the following conditions exist:

- In running ropes, six randomly distributed broken wires in one lay or three broken wires in one strand in one lay.
- Wear of one-third the original diameter of outside individual wires. Kinking, crushing, bird caging, or any other damage resulting in distortion of the rope structure.
- Evidence of any heat damage from any cause.

Accessible areas within the swing radius of the rear of the rotating superstructure of the crane, either permanently or temporarily mounted, shall be barricaded in such a manner as to prevent an employee from being struck or crushed by the crane.

All windows in cabs shall be of safety glass, or equivalent, that introduces no visible distortion that will interfere with the safe operation of the machine. Where necessary for rigging or service requirements, a ladder, or steps, shall be provided to give access to a cab rails. Guardrails, handholds, and steps shall be provided on cranes for easy access to the car and cab, conforming to American National Standards Institute B30.5. Platforms and walkways shall have anti-skid surfaces.

Except where electrical distribution and transmission lines have been deenergized and visibly grounded at point of work or where insulating barriers, not a part of or an attachment to the equipment or machinery, have been erected to prevent physical contact with the lines, equipment or machines shall be operated proximate to power lines only in accordance with the following:

- For lines rated 50 kV or below, minimum clearance between the lines and any part of the crane or load shall be 10 feet.
- For lines rated over 50 kV, minimum clearance between the lines and any part of the crane or load shall be 10 feet plus 0.4 inch for each 1 kV over 50 kV or twice the length of the line insulator, but never less than 10 feet.

In transit with no load and boom lowered, the equipment clearance shall be a minimum of 4 feet for voltages less than 50 kV, and 10 feet for voltages over 50 kV, up to and including 345 kV, and 16 feet for voltages up to and including 750 kV.

A person shall be designated to observe clearance of the equipment and give timely warning for all operations where it is difficult for the operator to maintain the desired clearance by visual means. All employees shall be kept clear of loads about to be lifted and of suspended loads.

Tag lines shall be used unless their use creates an unsafe condition.



The use of a crane or derrick to hoist employees on a personnel platform is prohibited.

## **RIGGING& SLING EQUIPMENT**

Rigging equipment for material handling shall be inspected prior to use on each shift and as necessary during its use to ensure that it is safe. Defective rigging equipment shall be removed from service.

Rigging equipment shall not be loaded in excess of its recommended safe working load, as prescribed in Tables H-1 through H-20 in 1926.252 (e) for the specific equipment.

Rigging equipment, when not in use, shall be removed from the immediate work area so as not to present a hazard to employees.

Slings used in conjunction with other material handling equipment for the movement of material by hoisting, in employments covered by this part. The types of slings covered are those made from alloy steel chain, wire rope, metal mesh, natural or synthetic fiber rope (conventional three strand construction), and synthetic web (nylon, polyester, and polypropylene).

"Inspections." Each day before being used, the sling and all fastenings and attachments shall be inspected for damage or defects by a competent person designated by the employer. Additional inspections shall be performed during sling use, where service conditions warrant. Damaged or defective slings shall be immediately removed from service.

Alloy steel chains. Welded alloy steel chain slings shall have permanently affixed durable identification stating size, grade, rated capacity, and sling manufacturer.

Hooks, rings, oblong links, pear-shaped links, welded or mechanical coupling links, or other attachments, when used with alloy steel chains, shall have a rated capacity at least equal to that of the chain.

The employer shall make and maintain a record of the most recent month in which each alloy steel chain sling was thoroughly inspected, and shall make such record available for examination.

**Job or shop hooks and links, or makeshift fasteners, formed from bolts, rods, or other such attachments, shall not be used.**

The following limitations shall apply to the use of wire rope:

Eyes in wire rope bridles, slings, or bull wires shall not be formed by wire rope clips or knots. Slings shall not be shortened with knots or bolts or other makeshift devices. Sling legs shall not be kinked. Hands or fingers shall not be placed between the sling and its load while the sling is being tightened around the load. Shock loading is prohibited. A sling shall not be pulled from under a load when the load is resting on the sling.

All welded end attachments shall not be used **unless** proof tested by the manufacturer or equivalent entity at twice their rated capacity prior to **initial use**. The employer shall retain a certificate of proof test, and make it available for examination.

Synthetic fiber-slings shall be inspected daily

Removal from service." Synthetic fiber rope slings shall be immediately removed from service if any of the following conditions are present: **Abnormal wear**. Powdered fiber between strands. Broken or cut fibers. Discoloration or rotting.

The employer shall have each synthetic web sling marked or coded to show: Name or trademark of manufacture. Rated capacities for the type of hitch.

"Webbing." Synthetic webbing shall be of **uniform thickness** and width and selvage edges shall not be split from the webbing's width.

Nylon web slings shall not be used where **fumes, vapors, sprays, mists or liquids of acids or phenolics** are present.

## **FLD 29      MATERIALS HANDLING**

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### **GENERAL**

### **REFERENCES**

Related FLD OPS:

*FLD02 – Inclement Weather*

*FLD22 – Heavy Equipment Operation*

*FLD23 – Cranes/Lifting Equipment*

### **PROCEDURE**

Materials must be stacked and stored to prevent sliding or collapsing.

Flammables and oxidizers must be stored in separate non-smoking areas and flammable gases must be stored away from combustible materials.

Tractor trailers must be chocked during loading and unloading. Deck plates and positive anchor systems must be used for delivery to elevated platforms at trailer floor level if unloaded by fork lifts. Trailers detached from tractors must have additional support if fork lifts will enter or if instability of load presents a hazard of front wheels collapsing.

Riders are prohibited on the outside of materials-handling equipment.

Cranes and any other equipment used for lifting must be inspected as required, and records of inspection must be maintained.

## **FLD 32      FIRE EXTINGUISHERS REQUIRED AND REQUIREMENTS**

### **GENERAL**

### **REFERENCES**

Related FLD OPS:

*FLD09 – Hot Work (Permits)*

*FLD21 – Explosives*

*FLD22 – Heavy Equipment Operation*

*FLD30 – Hazardous Materials Use and Storage*

*FLD31 – Fire Prevention/Protection/Response Plans*

*FLD36 – Welding/Cutting/Burning*

*NFPA 10 – Standard for Portable Fire Extinguishers*

Fire extinguishers are a key component of fire fighting. Fires that are small can be effectively fought with properly selected and correctly located extinguishers. The Fire Department should be notified as soon as a fire is discovered, and should not be delayed by awaiting the results of the application of portable fire extinguishers.

The successful use of fire extinguishers, according to National Fire Protection Agency (NFPA) Standard 10, depends on the following conditions having been met:

1. The fire extinguisher is properly located and in working order.
2. The fire extinguisher is of the proper type for a fire that can occur.
3. The fire is discovered while still small enough for the fire extinguisher to be effective.
4. The fire is discovered by a person ready, willing, and able to use the fire extinguisher.

To select an appropriate fire extinguisher, the situation must be considered for the type of fires anticipated (based on flammable and/or combustible sources on site), the facility construction, the anticipated hazard level, as well as the ambient air temperature conditions.

### **FIRE TYPES**

To determine the types of fires anticipated on site, NFPA classifies fires by type:

- Class A Fires – Fires in ordinary combustible materials, such as wood, cloth, paper, rubber, and many plastics.
- Class B Fires – Fires in flammable liquids, combustible liquids, petroleum greases, tars, oil-based solvents, lacquers, alcohols, and flammable gases.
- Class C Fires – Fires that involve energized electrical equipment.
- Class D Fires – Fires in combustible metals, such as magnesium, titanium, zirconium, sodium, lithium, and potassium.
- Class K Fires – Fires in cooking appliances that involve combustible cooking media (vegetable or animal oils and fats).

Corresponding to the types of fires, fire extinguishers are labeled to match fire types. Extinguishers suitable for Class A fires should be identified by a triangle containing the letter "A," and green (if colored). Extinguishers suitable for Class B fires should be identified by a square containing the letter "B," and red (if colored). Extinguishers suitable for Class C fires should be identified by a circle containing the letter "C," and blue (if colored). Extinguishers suitable for Class D fires should be identified by a 5-pointed star containing the letter "D," and yellow (if colored).

## **HAZARD CLASSIFICATION**

NFPA 10 classifies hazards on three levels; Light (Low), Ordinary (Moderate), and Extra (Heavy) Hazards.

### **Light Hazard**

Light (Low) hazard areas constitute locations where the total amount of Class A combustible materials is of minor quantity. This assumes that the majority of the items are either noncombustible or arranged so that fire is not likely to spread rapidly. An example of this hazard level would be an office setting. Small amounts of Class B flammables are included in this hazard level, provided that they are kept in closed containers, and appropriately stored.

### **Ordinary Hazard**

Ordinary (Moderate) hazard areas are locations where the total amount of Class A combustibles and Class B flammables are present in greater amounts than expected in Light hazard areas. Examples of these areas are dining areas, light manufacturing, workshops and support service areas of Light hazard occupancies.

### **Extra Hazard**

Extra (Heavy) hazard areas are locations where the total amount of Class A combustibles and Class B Flammables present in storage, production, use, and finished product (or combination thereof) is above areas of Ordinary hazard. These areas include woodworking, vehicle repair, cooking areas, and storage and manufacturing processes.

## **FIRE EXTINGUISHER RATINGS**

The classification and rating system describing fire extinguishers is that of Underwriters Laboratories, Inc. The class ratings correspond to the various fire types (A, B, C, D, and K), and the numerical value in front of the class rating dictates the size of fire it can extinguish. In principal, a 2-A fire extinguisher can extinguish twice as much fire as a 1-A. A 20-A fire extinguisher can extinguish 20 times as much fire. Each class rating has its own extinguishing media and corresponding volume. A 1-A fire extinguisher is the equivalent of 1 ¼ gallons of water, for reference.

Class B extinguishers can have gallons of foam, pounds of carbon dioxide, or pounds of a dry chemical.

Note: A fire extinguisher may be rated to fight the appropriate size fire, but the training and degree of experience of the operator influences this amount.

## **EXTINGUISHER SELECTION**

To select the appropriate number and locations of fire extinguishers throughout a facility, work areas must be evaluated based on a minimum rated single extinguisher (dictated by hazard level), the maximum floor area per unit of Class A hazards, the maximum floor area for the extinguisher, and the maximum distance of travel to the extinguisher.

### Fire Extinguisher Size and Placement for Class A Hazards

Criteria	Light Hazard	Ordinary Hazard	Extra Hazard
Minimum rated single extinguisher	2-A	2-A	4-A
Maximum floor area per unit of Class A hazards	3,000 square feet	1,500 square feet	1,000 square feet
Maximum floor area for extinguisher	11,250 feet	11,250 feet	11,250 feet
Maximum travel distance to extinguisher	75 feet	75 feet	75 feet

### Fire Extinguisher Size and Placement for Class B Hazards

Type of Hazard	Basic Minimum Extinguisher Rating	Maximum Travel Distance to Extinguishers (feet)
Light	5-B	30
	10-B	50
Ordinary	10-B	30
	20-B	50
Heavy	40-B	30
	80-B	50

## INSPECTION

Fire extinguishers shall be inspected when initially placed into service, and every 30 days thereafter. More frequent intervals can be maintained, should the situation require. Inspections should document the following:

1. Location in designated place
2. Obstructions to access or visibility
3. Operating instructions legible (with nameplate facing outwards)
4. Safety seals and tamper indicators intact
5. Fullness determined by weighing ("hefting" is acceptable)
6. Examination for obvious physical damage, corrosion, leakage, and clogged nozzle
7. Pressure gauge in the operable range or position
8. HMIS label in place

## SERVICING

Only trained personnel can perform maintenance, servicing, and recharging of fire extinguishers. Trained personnel will have the appropriate tools, manuals, recharge materials, lubricants, and manufacturer's replacement parts specifically listed for use in the fire extinguisher.

## **PROCEDURE**

Fire extinguishers appropriate in size and classification shall be present, readily accessible, and ready for use in all areas where there is potential for fires.

Fire extinguishers must be used in conjunction with an emergency response or contingency plan.

Health and Safety Plans must identify number, type, and location of all fire extinguishers related to a specific project.

Revised January 2006

## **FLD 34      UNDERGROUND UTILITIES**

### **PURPOSE**

This Field Operation Procedure (FLD) provides requirements for identification, location, and avoidance of underground utilities, appurtenances, and structures during intrusive activities. The FLD also addresses actions to be taken in response to encountering or contacting underground utilities. These requirements are applicable to all Weston Solutions, Inc. (WESTON) operations. The procedures address the requirements and recommendations for identifying and locating, working around, and encountering or contacting underground utilities.

### **DEFINITIONS**

#### **Aggressive Methods**

The use of mechanized equipment such as (but not limited to) excavators, backhoes, drill rigs, directional drilling, or road saws.

#### **Buffer Zone**

As defined in this procedure, the area around a utility where only non-aggressive excavation methods may be utilized, unless specific conditions are met.

The definition cited above, and the excavation requirements and restrictions associated with it, will vary depending on the particular state regulations. WESTON requires the imposition of a **three-foot** Buffer Zone on all sides of the utility as measured from the outside edges of the utility, both horizontally and vertically. Since most jurisdictions recognize Buffer Zones which vary somewhere in the range of 18 to 36 inches, this distance must be verified by consulting the applicable state regulations before excavating so that adjustments to surface markings can be made to achieve the WESTON-required three-foot buffer zone.

Referred to as the "Tolerance Zone", "Safety Zone", or "Approximate Location of Underground Utilities" in some jurisdictions.

#### **Competent Person**

A Competent Person has the ability to recognize hazards associated with underground utilities and the authority to stop or direct operations to ensure the safety of personnel and conformance with this procedure. The Competent Person has an understanding of this procedure, and the "One-Call" system requirements for the jurisdiction where excavation is occurring. The Competent Person must be capable of notifying One-Call agencies and maintaining and tracking One-Call Locate Numbers. Additionally, they must have knowledge of methods and work practices for excavation work and the identification, avoidance, and protection of underground utilities.

The designation of a Competent Person will be made by the Site or Project Manager and documented within the Site-specific Health and Safety Plan (HASP) or attachment to the HASP.

#### **Damage**

Any impact to or unanticipated removal of support from, an underground utility as a result of excavation or demolition. Damage may be as simple as minor contact (by any means) resulting in



displacement of protective coating. The utility owner must be contacted regarding any damage or question of damage.

### **De-Energize**

As applicable to a utility, to physically eliminate and/or prevent the presence, transmission, flow, or release of energy or materials which may cause harm to personnel or property.

### **Excavation (Intrusive Activity)**

An operation for the purpose of movement or removal of earth, rock, or the materials in the ground, including but not limited to; digging, blasting, augering, test boring, drilling, pile driving, directional drilling, grading, plowing-in, hammering, pulling-in, jacking-in, trenching, tunneling, structural demolition, milling, scraping, tree and root removal (grubbing), fence or sign post installation.

### **Jurisdiction**

The authority having legal jurisdiction relative to regulations and requirements for notification of excavation activities and associated identification and marking. In the United States, the States have jurisdiction, and most consider the regulations applicable when excavation is to be performed in any location, including any public or private way, any company right-of-way or easement, or any public or privately owned land or way. Note: One caveat to remember – Jurisdiction may flow to the “owner” on private or government-owned property because the State One-Call Agencies may not clear utilities on such facilities.

### **Locate**

To indicate the existence of a utility by establishing a mark through the use of flags, pins, stakes, paint, or some other customary manner, that *approximately* determines the location of a line or facility.

### **Locate Request**

A communication between an entity performing intrusive activities and a utility marking agency (One-Call, etc).

### **Non-Aggressive Methods**

Non-Aggressive methods involve the use of manual methods such as hand digging with shovels and air/hydro/vacuum methods.

### **Observer**

The person assigned to visually monitor and, as needed, signal the operator during mechanized intrusive activity when the activity is occurring within four feet of the outside edge of the buffer zone. This person remains in close communication with the equipment operator(s) and will stop the activity if needed.

### **One-Call Agency**

An entity that administers a system through which a person can notify owners/operators of underground lines or utilities of the intent to perform intrusive activities in proposed public areas. It is important to note that not all underground utility owners are required to join the One-Call system. The Site Manager or Competent Person is responsible to determine additional utilities that may need to be contacted individually.

### **Positive Response**

Verification prior to the intrusive activity, to ensure that all contacted (typically via the One-Call Agency) owner/operators have located and marked the underground utilities.

### **Potholing**

The practice of exposing an underground facility by safe, *non-aggressive* excavation methods in order to determine the precise horizontal and vertical position and orientation of underground lines or utilities.

### **Underground Utility**

An underground or submerged conductor, pipe, or structure used in transporting or providing electric, communications service, gas, oil or oil product, sewage, storm drainage, water or other service and appurtenances thereto. As used in this procedure, utility includes all underground appurtenances and structures.

The following are examples of the types of underground utilities that may be present in a given location:

- Natural gas pipelines
- Electric cables
- Water pipelines
- Fiber optic telecommunications lines
- Telephone cable lines
- Steam pipelines
- Gasoline, oil, or other fuels
- Sewer pipelines
- Vents for sewer and gasoline/diesel fueling systems
- Underground Storage Tanks (USTs)
- Abandoned underground structures containing hazardous materials, hazardous wastes, and radioactive materials

## **Underground Utility Owner**

Any person, utility, municipality, authority, political subdivision or other person or entity who owns, operates, or controls the operation of an underground line/facility.

## **White Lining**

The practice whereby the person (in this case WESTON or a Subcontractor) who intends to perform intrusive activities, pre-marks the site with an outline of the area where intrusive activities will occur. This involves the use of white paint, flags, stakes, or a combination thereof to mark the extent of where work is to be performed. The marking may vary depending on what intrusive activities are to be conducted. For example, for general excavation, an areal outline of the excavation shall be marked, while for drilling, the individual boreholes shall be marked. Studies have shown that pre-marking is a practice that does prevent utility contact incidents. Check State or local regulatory requirements to ensure compliance.

## **RESPONSIBILITIES**

### **Competent Person**

The Competent Person shall be responsible for:

- Obtaining a copy of, and understanding the applicable regulations for the state of jurisdiction where the excavation activities are to be performed.
- Contacting the appropriate One-Call Agency or private locating service, as applicable.
- Recording One-Call locate numbers.
- If necessary, renewing One-Call locate numbers before expiration.
- Ensuring that white-lining of the area to be excavated is performed; if another equal or better protective measure is necessary because of the nature of the work, state/local regulation or client requirements, the Health and Safety Plan should be amended to reflect the change.
- Ensuring that a “positive response” has been received from every utility owner/operator identified by the One-Call Agency (and any non-member utility as necessary) and that they have located their underground utilities and have appropriately marked any potential conflicts with the areas of planned intrusive activities prior to the start of intrusive work.
- Completion and maintenance of the Underground Utilities Locating and Marking Checklist (Attachment A) and the Underground Utilities Management Checklist (Attachment B).
- Reviewing applicable Activity Hazard Analyses (AHAs) with all project members before work begins.
- Conducting training on communication protocols to be used by the excavation observer and equipment operator.
- Ensuring Implementation of appropriate work practices during intrusive activities (including maintaining the prescribed buffer zone for use of aggressive methods).

- Conducting daily or more frequent (due to changes in conditions) inspections of the excavation area to make sure that all markings are intact.
- Providing the Site Health and Safety Coordinator (SHSC) with all required documentation on a daily basis.

### **Observer**

Whenever intrusive operations with mechanized equipment are being conducted *within three feet of the outside edge of the buffer zone, horizontally and vertically*, an observer must be assigned to monitor the activities. The observer is responsible for:

- Maintaining a safe vantage point relative to digging machinery, excavation edge and proximity to the hazard posed by the utility.
- Observing the operation to ensure that the operator stops operations if utilities are observed.
- Reviewing hand signals and other forms of communication with the operator. Note: hand signals should be as those identified under ANSI, OSHA or the Corps of Engineers for Crane Hand Signals, or another, equally effective and understood system.
- Properly signaling the operator.
- Stopping the operation immediately if the observer's attention must be diverted even momentarily.
- Stopping the operation immediately if a hand signal or other directive is not followed. Operations will not resume until the observer and operator mutually agree that the reason(s) for not complying with the directive(s) are/is identified and fully corrected.
- Maintaining required records, such as logbook entries, or other, as requested by line management.

### **Line Management**

The Project Manager (PM) or Site Manager (SM) shall be responsible for:

- Establishing the site culture with the assistance of the Site Health and Safety Coordinator that ensures compliance with this procedure.
- Providing the necessary resources for compliance with this procedure.
- Designating Competent Personnel prior to the start of work.

### **Environmental, Health and Safety Personnel**

The Site Health and Safety Coordinator (SHSC) shall be responsible for:

- Providing oversight on the implementation of the requirements contained in this procedure.
- Consulting with the PM, SM and Competent Person on underground utility issues.
- Acting as the Competent Person or Observer as necessary and qualified.

## PROCEDURE

The following sections provide the requirements and recommendations of this procedure, which are intended to prevent injury to personnel, damage to infrastructure, and associated indirect effects associated with encountering or contacting underground utilities during intrusive work. Underground utilities present multiple potential hazards that must be recognized before and during work which occurs near them, therefore, this procedure is divided into sections addressing underground utility identification and location, working around or near underground utilities, and actions to be taken in the event that underground utilities are encountered or contacted. Hazards that may be presented by underground utilities include explosion and fire, electrocution, toxic exposures, pathogens, and drowning.

### **Identifying and Locating Underground Utilities**

The potential for underground utilities or other subsurface feature (e.g., subsurface mines) must be evaluated as early as possible in the planning phase for any project, which involves intrusive activities. The following sections describe various methods for identifying and locating utilities on a site. The *Underground Utilities Locating and Marking Checklist* (Attachment A) and the *Underground Utilities Management Checklist* (Attachment B) must be completed before any activities meeting the definition of excavation are conducted. Attachment A is intended to be used as a guide during the process of locating and marking utilities in the area to be excavated. Attachment B is intended to be used as a guide in the overall process of underground utilities management during the course of the project.

**Note:** Attachments A and B or their equivalents must be used to document compliance with this operating procedure and will be subject to audit.

***Prior to excavation all underground utilities must be located and identified by at least two of the following:***

- ***The Utility Owner***
- ***A Private or Public Utility Locating Service***
- ***Review of the most current utility drawing, maps or other available records by an approved WESTON Competent Person***
- ***Use of utility locating technology by a WESTON Competent Person or Subcontractor***

As an aid in determining the potential for or existence of utilities follow the criteria outlined in Appendix C (Utilities Research Options).

## **Pre-Planning and the Site HASP**

The Site-Specific Health and Safety Plan (HASP) developed for the project must:

- Identify the location and types of **underground** utilities that are believed to be present on the site.
- Reference this procedure (FLD 34), and describe how it will be implemented on the project.
- Contain an Activity Hazard Analysis in which the hazards associated with underground utilities are identified, as well as the measures used to control them.
- Contain any site or contract-specific requirements (e.g., Corps of Engineers, EM 385-1-1, Section 25) that may be applicable.
- Contain clear and concise procedures to be followed in the event that contact with underground utilities occurs.
- Address underground utilities and potential associated scenarios in the emergency response section of the HASP.

## **“One-Call” Locating and Marking Services**

Every state has utility marking service programs having various names such as “One-Call”, “Dig-Safe”, “Call-Before-You-Dig”, “Dig-Safely”, and many others. These services will identify the types and locations of any utility that may exist in an area to be excavated, as long as the property is in the public domain.

- The appropriate One-Call service for the jurisdiction where the project is located must be contacted prior to beginning excavation work. The One-Call Agency should be given as detailed a description of the property as possible; address, cross street, utility pole numbers, physical description, etc.
- Notification to the One-Call service shall allow sufficient lead-time for the Agency to mark the utilities before excavation begins. The lead times vary, but range from two to ten days, depending on the state of jurisdiction.
- A complete listing of One-Call agencies and telephone numbers for all states is available in the “*Call-Before-You-Dig Call Center Directory*”, which can be accessed on the Internet at the WebPage (<http://underspace.com/index.htm>) sponsored by “*Underground Focus*” magazine.
- Once notified, the One-Call Agency will provide the contractor with a unique “locate number” or “reference number”. This reference number must be kept in the project files by the Competent Person or designee. Additionally, the reference numbers have expiration dates, which may vary depending on the particular One-Call Agency. The valid period of the locate number and required renew notification date shall be requested from the One-Call Agency.
- On a project with multiple contractors, each contractor must request a separate locate number. Under no circumstances will any other contractor or entity be allowed to “work under our locate number”. Subcontractors to WESTON may excavate under the locate number secured by WESTON, provided that they are excavating within the area which was

previously white-lined by WESTON and subsequently marked. **However, the One-Call Agency must be contacted and notified of this arrangement so that the subcontractor can be recorded as working under the existing locate number.** If a WESTON subcontractor will be excavating in an area not white-lined by WESTON, then the WESTON subcontractor must request a new locate. **Note: State and local requirements must be checked for local application of this procedure.**

- The area where work is to be performed shall be white-lined by WESTON personnel before the locating service goes to the site.
- It is good practice to arrange a pre-excavation meeting at the project site with the personnel performing the utility location and marking. This meeting will facilitate communications, coordinate the marking with actual excavation, and assure identification of high-priority utilities.
- The One-Call Agency should provide the identities of the utility owners that will be notified of the locate request. This information shall be recorded on the Underground Utility Locating and Marking Checklist (Appendix A) and maintained in the project files. The contact person and phone number for each utility owner shall also be recorded. Note that all utility owners are members of the One-Call system. This does not eliminate the need to contact a non-member owner if you have knowledge or suspect that excavation will impact their utility.
- The utility owners should provide a “positive response” relative to the locate request, which can consist of two types of action by the utility owner. The facility owner or operator is required to 1) mark its underground utilities with stakes, paint, or flags, or 2) notify the excavator that the utility owner/operator has no underground utilities in the area of the excavation.
- The positive responses shall be recorded on the Underground Utility Locating and Marking Checklist (Appendix A) and crosschecked with the list of utility owners that the One-Call Agency stated that they would notify. If it is discovered that a utility owner has not provided a positive response, then the One-Call Agency must be notified.
- Excavation shall not be conducted until positive responses have been received from all utility owners identified by the One-Call Agency as having underground utilities on the property.
- Before beginning excavation, the excavator must verify that the location marked was correct, and the distinct, color-coded markings of all utility owners are present.
- Examine the site to check for any visible signs of underground utilities that have not been located and marked such as pedestals, risers, meters, warning signs, manholes, pull boxes, valve boxes, patched asphalt or concrete pavement, areas of subsidence, fresh sod or grass, lack of grass or vegetation, and new trench lines.
- The markings placed by the utility owners should be documented by WESTON using a still, digital, or video camera, whenever practical and reasonable. The photo-documentation shall be maintained with the project files.
- The markings placed by the utility owners or marking services shall follow the American Public Works Association Uniform Color Code as described in ANSI Standard Z 535.1. This code follows:

### American Public Works Association Uniform Color Code

Red		Electric Power Lines, Cables, Conduit
Orange		Communications, Telephone, Cable TV
Yellow		Gas, Oil, Steam, Petroleum or Gaseous Materials
Green		Sewers and Drains
Blue		Potable Water Systems
Purple		Reclaimed Water, Irrigation, Slurry Lines
Pink		Temporary Survey Markings
White		Proposed Excavation

**Note:** Unless otherwise specified in the utility clearance, such clearance will not be considered valid after 30 days from the date it was issued.

#### Private Utility Locating and Marking Services

- **One-Call agencies arrange for the identification and marking of underground utilities only on public property, up to the point of contact with private property.** In the event that activities are to be conducted on non-public properties, the presence, location, depth, and orientation of all underground utilities shall be ascertained through records review, including any site plot plans, utility layout plans, and as-built drawings available from the property owner, as well as through interviews with knowledgeable personnel associated with the property (See Appendix C). Additionally, the information gathered from these sources shall be verified by physical detection methods (non-aggressive), performance of a geophysical survey, or by procuring the services of a private utility locating and marking service. If any detection methods are to be self-performed, the requirements within this FLD must be followed. **A list of vendors providing this service can be found in the “Network of Underground Damage Prevention Professionals” which can be accessed on the Internet at the “Underspace” WebPage (<http://underspace.com/index.htm>).**

#### Self-Performance of Utility Locating and Marking

The techniques and instruments used to locate and characterize underground utilities can be extremely complicated and difficult to use effectively. Additionally, interpretation of the data generated by this instrumentation can be difficult. The utility marking services, as previously described are staffed by well-trained, experienced professionals who perform locating activities on a regular basis. For these reasons, it is most desirable that these professional services are used for utility location and marking on projects.

- In some instances on private property or in other areas not served by One-Call agencies (e.g., long-term projects where excavation is a primary task, and the presence of underground utilities is extensive) it may be prudent to self-perform locating and marking activities.
- If locating and marking is to be self-performed, all personnel using instrumentation will be trained on the use of the equipment that will be used, and the interpretation of the data.
- There are variety of locating methods which may be utilized for self-performance of utility locating as categorized below:
  - Magnetic field-based locators or path tracers



- Buried electronic marker systems (EMS)
  - Ground penetration radar-based buried –structure detectors
  - Acoustics-based plastic pipe locators
  - Active probes, beacons, or sondes for non-metallic pipes
  - Magnetic polyethylene pipe
- Before self-performing any underground utility locating on a project, approval must be obtained from the appropriate WESTON Division EHS Manager or the Director, Corporate EHS and QA.

## **Working Near or Around Underground Utilities**

After the site has been properly evaluated for the presence of underground utilities, intrusive activities may begin. Since there is no perfect way of eliminating the hazards presented by underground utilities, an effort must be made to perform the tasks following the direction and guidance as described by the following best practices that should be implemented during the execution of the project.

### **Work Site Review**

Before beginning intrusive activities, a meeting shall be held between all members of the project team. This shall consist of a review of the marked utility locations with the equipment operators, observers, laborers, etc.

### **Preservation of Marks**

During excavation, efforts must be made to preserve the markings placed by the utility owners until they are no longer required. If any markings are obliterated, the One-Call Agency must be contacted for re-marking. No intrusive activities are to take place if markings are not visible.

### **Excavation Observer**

Whenever intrusive operations are being conducted within four feet of the edge of the buffer zone, an observer must be assigned to monitor the activities. The observer will be designated each day, and a review of hand signals and other forms of communication between the observer and operator will be conducted. The directives of the observer will be followed precisely and immediately by those operating equipment.

### **Excavation Within The Buffer Zone**

*Mechanical means of excavation may not be used within 36 inches (see Buffer Zone) of any marked or suspect utility until the utility has been exposed. Mechanical methods may be used, as necessary, for initial penetration and removal of pavement, rock or other materials requiring use of mechanical means of excavation provided a spotter is used. Once the underground utility has been exposed, further excavation must be performed employing reasonable precautions to avoid damage to the utility, including but not limited to any substantial weakening of structural or lateral support, or penetration or destruction of the utility or it's protective coatings. For purposes of this section, "mechanical means of excavation" means excavation using any device or tool powered by an engine except air vacuum or like methods of excavation.*

A request to utilize aggressive excavation methods in the buffer zone may be made if:

- There is no other appropriate and **reasonable** alternative to using aggressive methods in the buffer zone; and
- The utility has been de-energized (**and purged if necessary**), verified as de-energized, and locked-out; or
- The depth and orientation of the utility has been adequately and visually determined through the use of non-aggressive methods such as air/hydro/vacuum excavation, potholing, probing, hand-digging, or a combination thereof; and
- For utilities containing electrical energy, the depth of the existing water table is below the location of the utility; and
- Request for the exemption has been submitted to the appropriate Division EHS Manager and approved.

The following conditions will apply to this request:

- Aggressive methods may be used in the buffer zone only to the extent allowed by the applicable state or other jurisdictional regulations.
- Appropriate physical protection measures for exposed utilities shall be implemented to eliminate the potential for equipment contact with utilities.
- The extent of the project excavation area to be covered by the exemption request must be specified in the request for exemption.
- When evaluating the use of aggressive excavation methods in the buffer zone, the Division EHS Manager will consider the type of utility involved and the associated risk potential. Based on this evaluation, the Division EHS Manager may impose further conditions and requirements. Even if the above exemption conditions are met, the Division EHS Manager has authority to deny the request.

Unless exempted according to the above provisions of this procedure, only non-aggressive methods may be used within the buffer zone. These methods are used in order to prevent mechanical contact with underground utilities, which could result in damage to the utility and create the potential for personal injury and property damage. Following are examples of non-aggressive excavation methods:

- Hand-digging
  - Non-conductive hand tools must be used when digging within the buffer zone surrounding underground electrical utilities.
  - If conductive hand tools must be used near electrical lines, then the SHSC and/or Division EHS Manager shall be consulted to determine additional requirements relative to safe electrical practices, procedures, and equipment.
- Hydro-excavation (water pressure).
- Air excavation (air pressure).

- Vacuum extraction (soil excavation/removal).
- Air excavation/vacuum extraction combination.
- Aggressive methods may be used for the removal of pavement over a utility, if allowed by the state regulations.

### **Protection of Underground Utilities**

It is very important that consideration be given to the protection of underground utilities when performing adjacent intrusive activities. This is necessary not only to prevent physical damage and associated indirect effects, but also to prevent the potential for injury to employees and the public.

- When using aggressive excavation methods within the buffer zone around exposed underground utilities, physical protection must be used as required by OSHA in 29 CFR 1926.651. Basically, this involves creation of a physical barrier between the mechanized operation and the utility. The following are some possible types of physical protective measures:
  - Heavy timbers, similar to swamp or crane mats.
  - Sheets of plywood.
  - Blasting mats.
- Once exposed, underground utilities no longer have the support provided by surrounding soil and may need to be physically supported to prevent shifting, bending, separation, or collapse, which could result in damage to the utility, and possibly personnel. Following are suggested support methods:
  - Timber shoring underneath the utility.
  - Timbers or girders over the top of the excavation fitted with hangers that support the utility.
  - Design by a PE for complicated or large applications.
- Utilities must also be protected from objects that may fall into the excavation such as rocks and equipment. This can be accomplished by following these guidelines:
  - Cast spoils as far away from the excavation as possible. Excavated and loose materials shall be kept a minimum of two feet from the edge of excavations.
  - Relocate large rocks, cobbles, and boulders away from the excavation and sloped spoils piles.
  - When vehicles and machinery are operating adjacent to excavations, warning systems such as soil berms, stop logs or barricades shall be utilized to prevent vehicles from entering the excavation or trench.
  - Scaling or barricades shall be used to prevent rock and soils from falling into the excavation.

- Barriers shall be provided to prevent personnel from inadvertently falling into an excavation.

### **De-Energizing Utilities**

Utilities can carry many types of potential energy, including electricity, flowing liquids, liquids under pressure, or gasses under pressure. A release may happen if a utility conveyance is compromised and could result in personal injury, property damage, and other indirect effects. If the white lines of the proposed excavation area overlaps or extends into the buffer zone of a known underground utility, then if at all possible, that utility should be de-energized to physically prevent the transmission, flow, or release of energy. Conversely, if the buffer zone of the known utility lies outside of the white-lined, proposed excavation area, then de-energizing is not required.

- The owner of the utility shall be contacted to determine the feasibility and methodology of de-energizing the utility. Plenty of lead-time should be provided for this since it may take utility companies weeks to de-energize some utilities.
- Depending on the utility and the material being conveyed, isolation points which may be suitable for de-energizing include but are not limited to the following:
  - Electrical circuit breakers
  - Slide gate
  - Disconnect switches
  - Piping flanges
  - Other similar devices
- When utilities are de-energized, it must be verified by demonstration. This can be accomplished by methods such as, testing equipment, switching on a machine or lighting, or opening a valve. For any current-carrying electrical equipment, such as cables, electrical panels successful de-energizing must be certified through the use of appropriate electrical testing equipment and qualified personnel.
- Whenever a utility is de-energized, a means of ensuring that the energy isolation device and equipment cannot be operated until the device is removed must be provided.
- When de-energizing and locking out of utilities is practiced, the provisions of FLD 42 Lockout/Tagout shall be followed, as applicable.

### **Damage Discovery**

During excavation, utility damage may be discovered which is pre-existing or otherwise not related to a known contact. Disclosure to the utility owner is very important because the possibility of utility failure or endangerment of the surrounding population increases when damage has occurred. The utility may not immediately fail as a result of damage, but the utility owner or operator must be afforded the opportunity to inspect the utility and make a damage assessment and effect repairs if necessary. The following guidance applies:

- Observe and photograph the utility from a safe distance and determine if there is damage. Damage would be all breaks, leaks, nicks, dents, gouges, grooves, or other damages to utility lines, conduits, coatings, or cathodic protection systems.

- The owner of the affected utility must be contacted immediately.
- The One-Call Agency or private location service must be contacted immediately.
- A Notification of Incident (NOI) Report will be used to document such a discovery.

### **Encountering Unexpected Underground Utilities**

It is possible that underground utilities will be encountered in locations that have previously been “cleared” of having underground utilities by the locating service, or are found outside of the area, which has been marked as having underground utilities. In either case, if this occurs, the following applies:

- Site personnel must be warned and moved to a safe location; equipment engines and ignition sources should be turned off, if possible, as the operator is exiting his/her equipment.
- Intrusive activities must be stopped
- The owner of the affected utility must be immediately contacted.
- The One-Call Agency or private location service must be contacted immediately
- The PM, SM and SHSC must be notified
- No further intrusive activities may be conducted until:
  - The One-Call Agency/private location service and/or the subject utility owner visit the site;
  - Identification of the utility owner and the type of material/energy being conveyed by the utility has been made; and
  - The orientation and depth of the subject utility has been determined and suitably marked.
- A WESTON Notification of Incident (NOI) Report and Investigation form must be completed. The report should be accompanied by photographs clearly showing the marking(s), and the actual location, with a distance gauge to document how far off the mark the utility was encountered.

### **Contacting Underground Utilities**

If excavation or other equipment being used for intrusive activities makes contact with an underground utility, the following guidelines apply:

- Site personnel must be warned and moved to a safe location; equipment engines and ignition sources should be turned off, if possible, as the operator is exiting his/her equipment.
- Intrusive activities must be stopped immediately.

- Observe the utility from a safe distance and determine if there is damage. Damage would be all breaks, leaks, nicks, dents, gouges, grooves, scratched coatings, cathodic protection compromise, material leakage, obvious electrical energy.
- Move all personnel to the evacuation meeting point as described in the HASP.

***EXCEPTION:** If an electrical line has been contacted and it is your belief that equipment (such as an excavator) is electrically energized, do not approach the equipment. Order the operator to remain in the equipment until emergency personnel can de-energize the source (unless the equipment is on fire, at which time the operator should jump off of the vehicle and shuffle along the ground to a safe area). Shuffling is required because current flows outward through the soil in a ripple pattern called a power gradient, creating a pattern of high and low potential. Shuffling decreases the chance that these gradients could be bridged, causing current to flow through the body, resulting in electrocution.*

- Secure the area to prevent the public from entering.
- Contact emergency responders as specified in the HASP.
- The One-Call Agency or if known, the utility owner must be contacted immediately.
- The PM, SM and SHSC must be notified.
- No further intrusive activities may be conducted until:
  - The utility owner inspects the scene and after repairs, verifies that all danger has passed.
  - The orientation and depth of the subject utility has been determined and suitably marked.
  - Permission from the emergency responders to resume work has been given.
- A WESTON Notification of Incident (NOI) Report and Investigation form must be completed. The report should be accompanied by photographs clearly showing the marking(s), and the actual location, with a distance gauge to document how far off the mark the utility was encountered.
- State and Local regulations must be reviewed to determine if reporting to any additional agencies is required.

## **ATTACHMENTS**

Attachment A – Underground Utilities Locating and Marking Checklist  
Attachment B – Underground Utilities Management Checklist  
Attachment C – Utilities Research Options  
Attachment D – Sources of Information

**FLD 34 UNDERGROUND UTILITIES - ATTACHMENT A  
UNDERGROUND UTILITY LOCATING AND MARKING CHECKLIST**

*Weston Solutions, Inc.*

**To be Completed by PM and/or "Competent Person"**

**Complete Form as Location/Marking Progresses and Maintain in Site Files**

<b>PROJECT INFORMATION:</b>	<b>Location:</b>
<b>Project Name:</b>	Task/Activity:
WESTON Competent Person:	Start Date of Work:
WESTON Subcontractor: <input type="checkbox"/> No <input type="checkbox"/> Yes:	Private Locating Service Required: <input type="checkbox"/> Yes <input type="checkbox"/> No
Property Owner:	If Not, Explain:
<b>NOTIFICATION:</b>	
<b>Locating Service Name:</b>	Locating Service Tel. Number:
Date Locating Service Notified:	Locate Ticket Number:
Address of Property to be Marked:	Locate Ticket Expiration Date:
Nearest Intersecting Street:	
Are There Any Utilities on the Properties That the Locating Service Will Not Contact? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Specify:	
<i>Enter Utility Information in Table 1 Below. In Addition to Utility Locating Services, Consult Client, Utility Owners, Drawings, Facility Personnel, Maintenance Personnel, Municipalities (See Appendix C).</i>	

TABLE 1

**ON-SITE UTILITY INFORMATION**

NAME OF UTILITY COMPANY	TYPE OF UTILITY	COLOR CODE	UTILITY PRESENT ON-SITE?	EMERGENCY PHONE NUMBER	DATE MARKS COMPLETED
	Electric	RED			
	Communications, Phone, CATV	ORANGE			
	Gas, Oil, Steam, Petroleum	YELLOW			
	Sewers, Drains	GREEN			
	Potable Water	BLUE			
	Reclaimed Water, Irrigation	PURPLE			
	Temporary Survey Markings	PINK			
To be performed by excavator prior to utility mark-out.	Proposed Excavation	WHITE			

White-Lining Completed? No Explain: \_\_\_\_\_ Yes: Date: \_\_\_\_\_ By Whom? \_\_\_\_\_

**LOCATING AND MARKING:**

Have All Utilities Identified in Table 1 Been Marked? Yes ☐ No ☐ (If Not, Contact Locating Service for Resolution)

Problem(s) With Markings?

☐ Yes ☐ No ☐ No Marks

Incorrect Location

Too Wide

Other: \_\_\_\_\_

Not All Utilities Marked Per Table 1 (notify marking service)

Measurements Taken: Yes ☐ No ☐

Documentation of Marks: Photos ☐ Video ☐

Other: \_\_\_\_\_

**EXCAVATION:**

Utilities Accurately Marked? ☐ Yes ☐ No

If no, describe: \_\_\_\_\_

Were Unmarked or Mis-Marked Utilities Encountered? ☐ Yes ☐ No

If Yes, Specify: \_\_\_\_\_

Locating Service Notified? ☐ Yes ☐ No

Will Excavation Continue Past Locate Number Expiration? ☐ Yes ☐ No

If Yes, Locate Number Renewed? ☐ Yes ☐ No New Expiration Date: \_\_\_\_\_

Any Other Problems/Concerns? \_\_\_\_\_

Specify: \_\_\_\_\_

Form Completed By: \_\_\_\_\_

Signature: \_\_\_\_\_

Date: \_\_\_\_\_



**FLD 34 UNDERGROUND UTILITIES - ATTACHMENT B  
UNDERGROUND UTILITIES MANAGEMENT CHECKLIST**

*Weston Solutions, Inc.*

**To be Completed by PM and/or "Competent Person"**

**Complete Form as Project Progresses and Maintain in Site Files.**

PHASE		TASK	Y E S	N O	N A	COMMENTS Required if Response is No or NA. (Reference Item Number)
Pre-Planning	1.	Excavation in Work Scope?				
	2.	Underground Utilities Identified?				
	3.	Competent Person Assigned?				
	4.	Has a Copy of the Applicable State Regulations Been Obtained, Read, Understood?				
	5.	EHS Plan Addresses Underground Utilities? (AHAs, Contingency Plan, State Regulations Appendix)				
Identifying, Locating and Marking	6.	Locating and Marking Checklist Initiated? (Attachment A)				
	7.	Identification and Address of Property Determined, Including Nearest Intersection?				
	8.	One-Call Agency Contacted?				
	9.	Additional Locating and Marking Required on Property? (One-Call agency marks to public property line only)				
	10.	Additional Marker/Locator Identified?				
	11.	Additional Marker/Locator Qualified?				
	12.	Weston Self-Performing Location and Marking?				
	13.	If Yes to 12 Above, Approval From Division EHS Manager?				
	14.	Area of Excavation "White-Lined" by WESTON?				
	15.	WESTON Present When Markings Completed?				
	16.	All Utilities Marked? (Refer to Attachment A, Table 1)				
	17.	All Markings Photo/Video Documented?				
	18.	Area Checked for Signs of Previous Excavation? (Subsidence, new grass, patching, etc)				
	19.	All Applicable Information Recorded on Attachment A?				
	20.	Multiple Contractors Excavating On-Site?				
	21.	Separate Locate Requests for All Contractors?				
	22.	WESTON Subcontractors Excavating in WESTON White-Lined Area(s)?				
	23.	If Yes to 22 Above, One-Call Agency Contacted to Determine if WESTON Subcontractor Can be Added to Existing Locate Ticket?				
Excavation Activities	24.	Meeting and Site Walkover Conducted with Project Personnel? (Managers, Equipment Operators, Laborers, Competent Person, Excavation Observer, etc)				
	25.	AHA and HASP Review Conducted With Personnel?				
	26.	Do Site Activities Have Potential to Obliterate Utility Markings?				
Excavation Activities – Cont'd	27.	If Yes to 26 Above, Have Provisions Been Made to Preserve Markings?				

PHASE	TASK	Y E S	N O	N A	COMMENTS Required if Response is No or NA. (Reference Item Number)
	28. Has an Excavation Observer Been Designated to Monitor Excavation When Occurring within 3 Feet of the Buffer Zone?				
	29. Have Operator and Observer Reviewed Commands and Signals?				
	30. Has WESTON-Required Buffer Zone Been Marked on Either Side of Markings Placed by Locator?				
<b>Excavation Within Buffer Zone</b>	31. Is Excavation Within The Buffer Zone Absolutely Necessary?				
	32. If Yes to 31 Above, Can Non-Aggressive Methods Be Used For Excavation In The Buffer Zone? If Yes, Identify Appropriate Non-Aggressive Methods.				
	33. If No to 32 Above, Has a Buffer Zone Exemption Request Been Approved? If No, then Aggressive Methods May Not Be Used in The Buffer Zone.				
	34. If Yes to 33 Above, Has the Utility Been De-Energized, Purged, Verified/Tested, and Locked-Out? Or,  Has The Depth and Orientation of the Utility Been Adequately and Visually Determined Through The Use of Non-Aggressive Methods?				
	35. If Yes to 34 Above, Have All of The Following Conditions Been Met?  For Utilities Containing Electrical Energy, Is The Depth of The Water Table Below The Depth of The Utility?  Have Regulations Been Consulted to Determine Specific State Requirements Relative to Excavating in The Buffer Zone?  Have Appropriate Physical Protection Measures Been Implemented to Prevent Equipment Contact With Utilities and to Prevent Damage to Utilities?  If No to Any of The Above Conditions, Then Only Non-Aggressive Excavation Methods May Conducted in The Buffer Zone, Since The Conditions of The Exemption Have Not Been Satisfied.				
<b>Working Around Exposed Utilities</b>	36. If Necessary, Have Provisions Been Made to Support the Utility During Work Activities?				
	37. Have Spoils Been Placed as far Away From the Excavation as Feasible?				
	38. Has the Utility Been De-Energized? (If Any Portion of the Buffer Zone around a Utility is Inside of the White-Lined Area)				
	39. Has the Isolation Point for the De-Energized Utility Been Physically Locked-Out?				
<b>Working Around Exposed Utilities – Cont'd</b>	40. If No to 39 Above, Has a Spotter Been Assigned to Monitor Isolation Point?				
	41. If Yes to 40 Above, Does the Spotter Have Adequate Communications? (Radio, Telephone, etc)				
	42. Has the Isolation Point Been Tagged?				
<b>Damage Discovery</b>	43. Has Pre-Existing Damage to a Utility Been Discovered During Excavation?				

PHASE		TASK	Y E S	N O	N A	COMMENTS Required if Response is No or NA. (Reference Item Number)
	44.	If Yes to 43 Above, Has the One-Call Agency and/or Utility Owner Been Notified?				
	45.	If Yes to 43 Above, Have Photographs Been taken?				
Encountering or Contacting Underground Utilities	46.	Have Utilities Been Encountered in Locations That Have Not Been Marked?				
	47.	If Yes to 46 Above, Has the One-Call Agency or Other Locating Service Been Contacted?				
	48.	If Yes to 46 Above, Has the PM and Appropriate DSM Been Notified?				
	49.	If Yes to 46 Above, Has a WESTON Notification of Incident (NOI) Report Been Completed? (Include Photographs)				
	50.	Have Excavation Equipment Come In Contact With Underground utilities?				
	51.	If Yes to 50 Above, Were Intrusive Activities Immediately Curtailed?				
	52.	If Yes to 50 Above, Has a Damage Determination Been Made From a Safe Distance?				
	53.	If Yes to 50 Above, Has the Area Been Secured?				
	54.	If Yes to 50 Above, Have Emergency Responders Been Notified?				
	55.	If Yes to 50 Above, Has the Locating Agency and/or Utility Owner Been Notified?				
	56.	If Yes to 50 Above, Have State and Local Reporting Requirements Been Met?				
	57.	If Yes to 50 Above, Were Intrusive Activities Curtailed Until; Inspection From Utility Owner, Orientation and Depth of Utility Was Determined and Marked, Permission From Emergency Responders Given?				
	58.	If Yes to 50 Above, Has a WESTON Notification of Incident (NOI) Report Been Completed? (Include Photographs)				

CHECKLIST COMPLETED BY:

_____ NAME	_____ SIGNATURE	_____ DATE
_____ NAME	_____ SIGNATURE	_____ DATE

## **FLD 34 UNDERGROUND UTILITIES – ATTACHEMENT C**

### **UTILITY RESEARCH OPTIONS**

In the course of determining and verifying underground utility location it is expected that a minimum of two (2) resources will be used. As a means of assisting the search for sources, the following is offered.

#### **Records Sources:**

- ☐ Utility Section of the State DOT or other Public Agency
- ☐ One-Call Center
- ☐ Public Service Commission or similar organization
- ☐ County Clerks Office
- ☐ Landowner
- ☐ Internet or Computer database
- ☐ Visual Site Inspection
- ☐ Utility Owner

#### **From the Above Collect:**

- ☐ Previous construction plans in the area
- ☐ Conduit maps
- ☐ Direct-Buried Cable records
- ☐ Distribution maps
- ☐ Service record maps
- ☐ As-built and record drawings
- ☐ Field notes
- ☐ County, city, utility owner or other geographic information system database
- ☐ Circuit diagrams
- ☐ Oral histories (current or previous employees, residents).

#### **Review Records and Obtain Information For:**

- ☐ Indications of additional and/or other available records
- ☐ Duplicate information that lends credibility to data
- ☐ Any additional need for clarifications from owners/others

## FLD 34 UNDERGROUND UTILITIES – ATTACHMENT D SOURCES OF INFORMATION

### **Organizations**

- Common Ground Alliance  
<http://www.commongroundalliance.com/wc.dll?cga~toppage>
- Center for Subsurface Strategic Action (CSSA)  
<http://underspace.com/cs/index.htm>
- DigSafely  
<http://www.digsafely.com/digsafely/default.asp>
- National Utility Contractors Association (NUCA)  
<http://www.nuca.com/>
- National Utility Locating Contractors Association (NULCA)  
<http://underspace.com/nu/index.htm>
- Underground Focus Magazine  
<http://underspace.com/uf/index.htm>
- NUCA State Listing of One-Call centers  
<http://www.nuca.com/>
- Utility Safety Magazine  
<http://www.utilitysafety.com/>

### **Vendors and Commercial Sites**

- RadioDetection, Inc. (Detection Instruments)  
<http://www.radiodee.com/>
- Heath Consultants (Detection Instruments)  
<http://www.heathus.com/>
- Ben Meadows Company (Detection Instruments)  
<http://www.benmeadows.com/cgi-bin/SoftCart.exe/index.html?E+scstore>
- So-Deep, Inc. (Complete Utilities Services)  
<http://www.sodeep.com/>
- Concept Engineering Group, Inc. (Air Excavation Equipment)  
<http://www.air-spade.com/index.html>
- Rycom Instruments, Inc. (Detection Instruments)

<http://www.rycominstruments.com/>

- Schonstedt Instrument Company (Detection Instruments)

<http://www.schonstedt.com/>

- Forestry Suppliers, Inc. (Fiberglass Probe – “Fiberglass Tile Probe”, Part #77543, Approx. \$20.00, Telephone 800-647-5368)

<http://www.forestry-suppliers.com/>

## REFERENCES

- *Common Ground Study of One-Call Systems and Damage Prevention Best Practices*, August, 1999, Sponsored by US DOT.

Revised 0104

## **FLD 35      ELECTRICAL SAFETY**

### **GENERAL**

### **REFERENCES**

Related FLD OPS:

*FLD02 – Inclement Weather*

*FLD08 – Confined Spaces Entry*

*FLD26 – Ladders*

*FLD27 – Scaffolding*

*FLD34 – Utilities*

*FLD35 – Electrical Safety*

*FLD38 – Hand and Power Hand Tools*

### **PROCEDURE**

Work areas shall be checked for the presence of high voltage and other hazardous electrical sources. Sources shall be labeled and work areas provided with shielding or located at sufficient distance from electrical sources to prevent contact or arcing to personnel or equipment. Checks must be made for overhead as well as underground electric lines. If work involves work at elevation including use of ladders, aerial lifts and scaffolding, elevating equipment structures (FLD's 25, 26, 27 and 28 must also be followed) or excavation (FLD's 21 and 34 must be followed).

Overhead utilities shall be located and steps taken to ensure there will be no encroachment within defined Safety distances (minimum of 10 feet or follow 29 CFR 1910 for voltages over 50 kilovolts) of exposed electric conductors) let alone adverse contact with overhead utilities prior to positioning or moving any elevated work platform or rig superstructure.

When high-voltage electrical service is required for site or project activities, service shall be connected by certified electricians in accordance with all applicable local and national electrical codes.

Ground fault circuit interrupters shall be used on construction sites for all 110 to 115 15 to 20 amp outlets, in the absence of properly grounded circuitry or when portable tools must be used around wet areas.

Electric lines, cables, and extension cords must be appropriately guarded and maintained in good condition.

No work will be done on electrical lines or electrically activated equipment until verification is made that service has been disconnected and/or the system has been locked and tagged out, and the individual doing the work has sole possession of a key to the lock on the lock-out hasp. Protective grounds must also be provided and all work accomplished within the protective grounds. Incorporate outage procedures from APG)

## High Voltage

Whenever possible, electrical equipment and **electrical** conductive equipment will be guarded or de-energized as a means of engineering control. **When** it is necessary to work with or around energized power transmission equipment, and use of **permanent** guarding is infeasible, grounding and personnel protective equipment is required. Work must be done by personnel who have been specially trained to work around high voltage electricity.

1. Live line work or work within the specified safe distances established by Table V-1, 29 CFR 1926.950, must be performed by qualified, competent people.
2. Electrical personnel protective equipment must be non-conductive rubber material with electrical and mechanical protection equal to or better than rubber. Rubber protective equipment must be in accordance with American National Standards Institute (ANSI) J6 series of Standards. For example:
  - Rubber insulated gloves (J6.6).
  - Rubber matting for use around electric equipment (J6.7).
  - Rubber insulated blankets (J6.4).
  - Rubber insulated hoods (J6.1).
  - Rubber insulated line hose (J6.1)
  - Rubber insulated sleeves (J6.5).

Rubber or equivalent protective equipment must be:

- Visually inspected by a competent person before each use.
- Air tested before each use.
- Laboratory retested periodically.
- Stored so sunlight or folding will not cause damage or deterioration.

Hard hats worn around electrical hazards must be class "B" according to ANSI Standard Z89.2.

4. Body belts, lanyards, and lifelines used around electrical hazards must be able to:
  - Withstand an AC dielectric test of not less than 25,000 volts per foot "dry" for 3 minutes without visible signs of deterioration.
  - Allow less than one (1) milliampere leakage when 3,000 volts is applied 12 inches apart.
5. Hot line tools must be able to withstand voltages of 100,000 volts per foot if fiberglass, or 75,000 volts per foot if wood.

## Electrical Flash Protection

Hazardous flash can occur in any electrical device, regardless of voltage, in which energy is high enough to sustain an arc. This includes many 440V motor control centers, panel boards, and switch boards. An arc of this type, while typically less than a second in duration, can reach temperatures in excess of 14,000 degrees F--high enough to produce extensive first degree burns, permanent blindness, or death.



NFPA 70E specifies boundaries within which flash protection is required in an effort to reduce the extent of injuries. Protective equipment is also specified including flash resistant clothing and face shielding. Boundary distances vary depending on both the qualifications of the person being exposed and the voltage involved. Unqualified personnel must be accompanied by qualified personnel. All personnel within the defined boundaries must wear specified protective equipment.

The following boundary distances for flash protection have been established in NFPA 70E: If you are working within the following approach distances, flash protection is required:

#### **VOLTAGE FLASH PROTECTION BOUNDARY**

up to 750V	3 feet
750V to 2kV	4 feet
2kV to 15kV	16 feet
15kV to 36kV	19 feet
over 36kV	Must be Calculated

Flash protection equipment includes flash resistant clothing and face and neck shield. Flash resistant personal protection equipment will not protect you from shock, but it will give substantial protection from the effects of flash, especially burns and eye damage.

Flash protective clothing is specified by ASTM F1506 while eye protection must comply with ANSI Z87.1. Clothing coverage must be 100%, i.e. coveralls or shirt and trousers. Eye protection can include either a face shield (with neck protection) or "bee keeper's hood." Eye protection will provide significant filtering of the damaging ultraviolet (UV) radiation associated with a flash.

#### **Demolition.**

As part of building total or partial demolition all utilities that could be affected must be identified and de-energized and as appropriate, disconnected at entry points to the building or building area to be demolished. Prior to actual demolition of enclosures, walls etc., verification of electrical de-energizing must be by use of a tick tracer or similar device.

#### **Extension cords:**

- Must meet Underwriter's Laboratory (UL), Factory Mutual (FM) or other rating criteria according to Occupational Safety and Health Administration (OSHA).
- Extension cord sets used with portable electric tools and appliances shall be of three-wire type and shall be designed for hard or extra-hard usage. Flexible cords used with temporary and portable lights shall be designed for hard or extra-hard usage.

- NOTE: The National Electrical Code, ANSI/NFPA 70, in Article 400, Table 400-4, lists various types of flexible cords, some of which are noted as being designed for hard or extra-hard usage. Examples of these types of flexible cords include hard service cord (types S, ST, SO, STO) and junior hard service cord (types SJ, SJO, SJT, SJTO).

- Use will be limited to essential tasks.
- Must be tested for continuity before each use and must be connected to grounded outlets, or ground fault current interrupters must be used.
- Ground Fault Circuit Interrupters (GFCI) must be integrated into or used on all 120 volt, 15 - 20 Amp circuits on construction sites and in wet areas.
- Must be inspected daily for loose insulation, broken or missing plugs, bared wires, or other hazards and must not be used for lifting or tying off, and shall be disconnected by pulling on the plug
- 
- Grounding of outlets used for portable tools and ground fault circuit interruption must be confirmed before use.
- Must not be allowed to become tripping or slipping hazards and must be protected from damage.
- Must not be run through holes in walls, ceilings, or floors.

## **FLD 36      WELDING/CUTTING/BRAZING/RADIOGRAPHY**

### **GENERAL**

### **REFERENCES**

AWS Organization: <http://www.aws.org/>

Safe Practices for Gas-Shielded Arc Welding, A6.1-1966, American Welding Society  
29 CFR 1910.252-255

29 CFR 1926.350

Compressed Gas Association Pamphlet P-1-1965

American National Standards Institute, Z49.1-1967, Safety in Welding and Cutting  
EM 385-1-1

### **PROCEDURE**

Only those persons competent by reason of formal training or documented experience shall perform welding, cutting, and burning. Each welding and cutting process has its specific hazards and training requirements.

Personnel or subcontractors designated to operate arc welding, SMAW (Shielded Metal Arc Welding) GMAW (Gas Metal Arc Welding), GTAW (Gas Tungsten Arc Welding), plasma cutters, oxygen and acetylene equipment shall have been properly trained and qualified to operate such equipment. Certification of experience and training shall be provided to the site manager or responsible person. Also, it is recommended that personnel understand the Safe Practices for Gas-Shielded Arc Welding, A6.1-1966, American Welding Society.

Site workers and the public shall be shielded from welding rays, flashes, sparks, molten metal, and slag. Sensitive environments should be protected from welding debris.

### **Fire Prevention and Protection for Welding/Cutting and Grinding**

Hot work permits shall be completed before any welding, cutting, or grinding begins. See FLD for hot work procedures. All welding equipment shall be inspected daily. Cables shall be inspected daily for cuts or abrasions and removed if they are unserviceable. Defective equipment shall be removed from service or repaired.

Fire watches are required whenever welding, cutting, or grinding is performed in locations where other than a minor fire might develop.

Firewatchers shall have fire-extinguishing equipment readily available and be trained in its use. They shall be familiar with facilities for sounding an alarm in the event of a fire. Fire watches shall continue 30 minutes after the end of hot work.

Report ALL fires to the fire department or per Client direction, as the potential for smoldering fires exists.

**Fire extinguishers.** Suitable fire extinguishing equipment shall be maintained in a state of readiness for instant use. Such equipment may consist of pails of water, buckets of sand, hoses, or portable extinguishers depending upon the nature and quantity of the combustible material exposed.

**Fire hazards.** If the object to be welded or cut cannot readily be moved, all movable fire hazards in the vicinity shall be taken to a safe place.

**Guards/Blankets.** If the object to be welded or cut cannot be moved and if all the fire hazards cannot be removed, then guards/blankets shall be used to confine the heat, sparks, and slag, and to protect the immovable fire hazards. When practical, place plywood beneath blankets to provide a flat surface to walk on (minimize tripping hazard) and to provide an additional protective layer should breakthrough occur.

**Ducts & Conveyor Systems.** Any path that might carry sparks to distant combustibles shall be suitably protected or shut down.

**Combustible Walls.** Where cutting or welding is done near walls, partitions, ceiling, or roof of combustible construction, fire-resistant shields or guards shall be provided to prevent ignition.

**Noncombustible Walls.** If welding is to be done on a metal wall, partition, ceiling, or roof, precautions shall be taken to prevent ignition of combustibles on the other side, due to conduction or radiation, preferably by relocating combustibles. Where combustibles are not relocated, a fire watch on the opposite side from the work shall be provided.

**Piping coatings.** Strip all coating in areas to be cut or welded, as coatings can give off hazardous fumes or catch fire. Coatings should be stripped at least four inches to each side of the weld location. Have lead based paint removed by a licensed contractor. Be aware of potential for smoldering fires in piping insulation.

## **General – Welding & Welding Procedures**

Welding Procedures (WPS), Procedure Qualification Records (PQR) and Welder Operator Qualifications (WOQ) must be in place prior to any welding being performed. Weston currently has WPS & PQR's for SMAW-GTAW and GTWA/SMAW for carbon and stainless steel. Each of these WPS's has a PQR or has a PQR for a pre-qualified procedure. A weld operator test shall be done for each type of welding performed. Approved test results must be on file for each operator and his welding technique.

Welding equipment shall be chosen for safe application to the work to be done. Safety will be assured by choosing apparatus complying with the Requirements for Electric Arc-Welding Apparatus, NEMA EW-1-1962, National Electrical Manufacturers Association or the Safety Standard for Transformer-Type Arc-Welding Machines, ANSI C33.2-1956, Underwriters' Laboratories, both of which are incorporated by reference as specified in 29 CFR 1910.

Before any operations are started, heavy portable equipment mounted on wheels shall be securely blocked to prevent accidental movement.

All ground connections shall be checked to determine that they are mechanically strong and electrically adequate for the required current. Any equipment operated by the welding generator shall use Ground Fault Circuit Interrupters (GFCI) to protect operators from electrical shock. Cables with damaged insulation or exposed bare conductors shall be removed or replaced.

Be aware of power in use. Some welding equipment can produce DC power, which may damage tools designed for AC power.

**Electrode holders.** Electrode holders when not in use shall be so placed that they cannot make electrical contact with persons, conducting objects, fuel or compressed gas tanks.

**Electrode removal.** When arc welding is suspended for any substantial period of time, such as during lunch or overnight, all electrodes shall be removed from the holders and the holders carefully located so that accidental contact cannot occur. The machine shall be disconnected from the power source.

**Electric shock.** Cables with splices within 10 feet (3 m) of the holder shall not be used. The welder should not coil or loop welding electrode cable around parts of his body.

**Hot Tapping Flammable Substance Lines.** Welding on active fuel pipelines requires extra attention. Fuel must be flowing through the pipeline to prevent ignition. Care must be exercised to prevent burning through the pipeline in these conditions. For "Hot Tapping," special procedures and approval are required. Contact your Division Environmental Health and Safety Manager for guidance. The connection, by welding, of branches to pipelines carrying flammable substances shall be performed in accordance with Welding or Hot Tapping on Equipment Containing Flammables, API Std. PSD No. 2201-1963.

## **Welding Equipment, Operation, Storage and Cylinder Handling**

Portable welding vehicles, trailer mounted units and equipment. All Weston owned or employed truck or trailers shall be inspected prior to any welding operations. Equipment that is unsafe or requires repair shall be removed until repaired

Mixtures of fuel gases and air or oxygen may be explosive. No device or attachment facilitating or permitting mixtures of air or oxygen with flammable gases prior to consumption, except at the burner or in a standard torch, shall be permitted. Only approved apparatus such as torches, regulators, or pressure-reducing valves shall be used.

Compressed gas cylinders shall be legibly marked, for the purpose of identifying the gas content, with either the chemical or the trade name of the gas. Such marking shall be by means of stenciling, stamping, or labeling, and shall not be readily removable. Whenever practical, the marking shall be located on the shoulder of the cylinder.

Cylinders shall be stored in a well-protected, well-ventilated, dry location, at least 20 feet from highly combustible materials. Metal chains shall be used to secure cylinders to walls or storage containers. Cylinders shall not be kept in unventilated enclosures such as lockers and cupboards.

Valve protection caps, where the cylinder is designed to accept a cap, shall always be in place, hand-tight, except when cylinders are in use or connected for use. Empty cylinders shall be secured, have their valves closed, and the cylinder marked "empty."

Acetylene cylinders shall be stored and transported valve end up. Oxygen cylinders shall not be stored near highly combustible materials, especially oil and grease; or near reserve stocks of carbide and acetylene or other fuel-gas cylinders, or near any other substance likely to cause or accelerate fire; or in an acetylene generator compartment.

Oxygen cylinders in storage shall be separated from fuel-gas cylinders or combustible materials a minimum distance of 20 feet or by a noncombustible barrier at least 5 feet high having a fire-resistance rating of at least one-half hour.

Cylinders, cylinder valves, couplings, regulators, hose, and apparatus shall be kept free from oily or greasy substances. Oxygen cylinders or apparatus shall not be handled with oily hands or gloves. A jet of oxygen must never be permitted to strike oily surfaces, greasy clothes, or enter a fuel oil or other storage tank. All connections should be adequately torqued and sealed with Teflon tape or pipe dope.

When cylinders are transported by a crane or derrick, a cradle, boat, or suitable platform shall be used. Slings or electric magnets shall not be used for this purpose. Valve-protection caps, where the cylinder is designed to accept a cap, shall always be in place. Valve-protection caps shall not be used for lifting cylinders. Valve-protection caps are designed to protect cylinder valves from damage.

Cylinder valves shall be closed before moving the cylinders. Cylinder valves shall be closed when work is finished. Valves of empty cylinders shall be closed. Cylinders shall be kept far enough away from the actual welding or cutting operation so that sparks, hot slag, or flame will not reach them, or fire-resistant shields shall be provided.

A hammer or wrench shall not be used to open cylinder valves. If valves cannot be opened by hand, the supplier shall be notified.

Fuel-gas cylinders shall be placed with valve end up whenever they are in use. Liquefied gases shall be stored and shipped with the valve end up. Cylinders shall be handled carefully. Rough handling, knocks, or falls are liable to damage the cylinder, valve, or safety devices and cause leakage.

Before a regulator is connected to a cylinder valve, the valve shall be opened slightly and closed immediately. When opening a valve, personnel should stand to one side of the outlet; never in front of it. A fuel-gas cylinder valve should never be cracked near other welding work or near sparks, flame, or other possible sources of ignition.

Before a regulator is removed from a cylinder valve, the cylinder valve shall be closed and the gas released from the regulator. Nothing shall be placed on top of an acetylene cylinder when in use that may damage the safety

## **Container Welding or Cutting**

No welding, cutting, or other hot work shall be performed on aboveground storage tanks (ASTs), underground storage tanks (USTs), or other containers until they have been cleaned so thoroughly as to make absolutely certain that there are no flammable materials present. Any pipelines or connections to the drum or vessel shall be disconnected or blanked. Whenever possible, the ground should be connected directly to the vessel being welded. The AST/UST will be certified "Gas Free" prior to any welding or cutting. Barrels or any other used container shall not be cut.

## **Welding or Cutting Pipelines**

When repairing fuel pipelines, pipelines should be drained completely and flushed if feasible. Ensure physical separation between the piping segment and fuel source, as well as lockout/tagout possibilities. Physical separation can include removing valves at junctions, inserting slip blinds between piping segments, and installing blind flanges.

If flushing the pipeline is not feasible, use alternate means of inerting the pipeline under the supervision of a licensed Marine Chemist or a Certified Industrial Hygienist. Inflatable piping plugs, plumber's plugs, dry ice, and gasses such as nitrogen or carbon dioxide may be used for inerting piping segments for repairs. Whenever possible, ground directly to the vessel being welded.

Inflatable plugs provide a physical barrier between possible fuel sources and weld locations. Ensure that the plug maintains a tight seal by monitoring the plug pressure gauge. Be aware of the potential for weld slag to damage the plug, as well as airlines pressuring the inflatable plug. Compression type plumber's plugs provide the same protection, but may not seal as tightly as inflatable plugs if the piping interior has an uneven surface due to corrosion. Ensure that plugs are securely tied at the piping end, in the event that vacuum is applied to the piping from another location.

Dry ice provides multi-level fire protection. Dry ice lowers the temperature of possible residual fuels, preventing ignition. Dry ice also releases carbon dioxide, which displaces oxygen in the repair area, preventing ignition and also creating a vapor plug. Dry ice is relatively inexpensive, and can be stored in coolers until needed. Special handling of dry ice is required to prevent damage to skin.

Nitrogen (an inert gas) and carbon dioxide can be used for purging combustible vapors from a pipeline, as well as removing oxygen. Use of inerting gasses require continuous air monitoring to ensure oxygen levels in the pipe segment remain below the specified percent (usually below 5%). Air monitoring in the worker breathing space should also be conducted to ensure that these gasses are not depleting oxygen levels in work areas. Ensure proper ventilation to allow for air

change in the work area. In addition to air monitoring, it is important to provide grounding to limit the possibility of static at vapor purge points.

## **Welding/Cutting in Confined Spaces**

For welding in confined spaces, refer to FLD 08 for confined space procedures. Do not allow attendant to function as a helper, secure additional crew to assist. Clearly defined roles may add additional laborers, but will ultimately increase safety and productivity. Establish escape routes prior to commencing work, and maintain the clearest path possible to exit.

In order to eliminate the possibility of gas escaping through leaks or improperly closed valves when gas welding or cutting, the torch valves shall be closed and the gas supply to the torch positively shut off at some point outside the confined area whenever the torch is not to be used for a substantial period of time, such as during lunch hour or overnight. Where practicable, the torch and hose shall also be removed from the confined space.

When a welder/helper must enter a confined space through a manhole or other small opening, means shall be provided for quickly removing the individual in case of emergency. Full body harnesses with a retrieval lanyard shall be worn and a plan determined on how to remove the individual. If required, ventilation shall be used to work in confined spaces.

All hollow spaces, cavities or containers shall be vented to permit the escape of air or gases before preheating, cutting or welding. Purging with inert gas is recommended.

## **Personnel Protection**

### **Personal Protective Equipment/Eye, Face, and Skin Protection**

Employees exposed to the hazards created by welding, cutting, or brazing operations shall be protected by personal protective equipment. Appropriate protective clothing required for any welding operation will vary with the size, nature, and location of the work to be performed. At the minimum, long-sleeved shirts and gloves will be worn to prevent burns. No skin should be exposed from the neck down during welding and grinding. Exercise caution when transporting used fire blankets, as weld slag, grinding dust, and material fibers may cause severe skin irritation.

Helmets with face shields shall be used during all welding/arc/cutting operations. Helpers or attendants shall be provided with proper eye, face, and skin protection. Loss of eyesight can occur from the luminescence of welding, cutting, and grinding. If the production schedule and space permit, arrange welding teams to face away from each other to prevent accidental flash exposures.

Goggles or other suitable eye protection shall be used during all gas welding or oxygen cutting operations. Spectacles without side shields, with suitable filter lenses are permitted for use during gas welding operations on light work, torch brazing, or inspection.



Personnel should reference OSHA regulation 29 CFR 1910.252(b)(2)(ii)(H) or ANSI Z49 Table 1 standard as a guide for the selection of proper filter shades. These recommendations may be varied to suit the individual's needs.

All filter lenses and plates shall meet the test for transmission of radiant energy prescribed in ANSI Z87.1-1968 - American National Standard Practice for Occupational and Educational Eye and Face Protection, which is incorporated by reference as specified in 29 CFR 1910.6.

Hearing protection should be worn when using grinders and needle guns for surface preparation and weld repairs.

### **Protection from Arc Welding Rays**

Where the work permits, the welder should be enclosed in an individual booth painted with a low reflectivity finish such as zinc oxide (an important factor for absorbing ultraviolet radiations) and lamp black, or shall be enclosed with noncombustible screens similarly painted. Booths and screens shall permit circulation of air at floor level. Workers or other persons adjacent to the welding areas shall be protected from the ultraviolet rays by noncombustible or flameproof screens or shields or shall be required to wear appropriate goggles.

### **Radiography Inspections**

The use of X-rays and radioactive isotopes to inspect welded pipeline joints shall conform to the American National Standard Safety Standard for Non-Medical X-ray and Sealed Gamma-Ray Sources, ANSI Z54.1-1963. Radiography is a contracted function, and special training and licensing are required. All subcontractors must follow local and state guidelines for bringing radioactive sources to WESTON jobsites. Project Managers/Site Managers have the responsibility of reviewing radiography procedures at our sites. No subcontractor shall bring a radioactive source on a US military installation without following established procedures and notifications. Each military service or private operation has different procedures for notifying management of radiography operation. Determine this procedure prior to transporting radioactive sources on US military bases or private property. The radiography contractor shall brief site personnel on hazards and procedures. The contractor shall provide required procedures that comply with state laws and the requirements for safe operation. Maintain multiple copies of permits, permission letters, and notification letters.

Develop a traffic plan if exclusion zones require blocking pedestrian and vehicular traffic. Stronger sources require shorter exposure times, but wider exclusion zones. Develop clear verbal signals for preventing access to the area, notification of opening source, notification of closing source, and all clear for traffic to resume.

On all Federal facilities NRC Form 241 must be submitted and approved prior to any Radiography activities. Your licensed subcontractor shall have this form. Please note this only applies to the United States and its territories.

## **Health Protection in Hazardous Atmospheres and Ventilation Issues**

Local exhaust or general ventilating systems shall be provided and arranged to keep the amount of toxic fumes, gases, or dusts below the maximum allowable concentration as specified in 29 CFR 1910.1000.

Three factors in arc and gas welding determine the amount of contamination to which welders may be exposed:

- Number of welders operating in an area
- Evolution of hazardous fumes, gases, or dust according to the metals involved
- Containment or structure of welding area. When welding must be performed in a space entirely screened on all sides, the screens shall be arranged to prevent serious restriction of ventilation. The screens should be mounted about 2 feet (0.61 m) above the floor unless the work is performed at a level that requires the screen to be extended nearer to the floor to protect nearby workers from the glare of welding.

### **Precautionary labels**

A number of potentially hazardous materials are employed in fluxes, coatings, coverings, and filler metals used in welding and cutting or are released to the atmosphere during welding and cutting. The suppliers of welding materials shall determine the hazard, if any, associated with the use of their materials in welding, cutting, or grinding. Individual material cautions and warning are provided below under the specific chemicals to which they apply. The following caution label is appropriate for general welding operations.

#### **CAUTION**

Welding may produce fumes and gases hazardous to health. Avoid breathing these fumes and gases. Use adequate ventilation. See ANSI Z49.1-1967 Safety in Welding and Cutting published by the American Welding Society.

### **Ventilation for general welding and cutting**

Mechanical ventilation shall be provided when welding or cutting metals not covered in section. In addition, welding and cutting under the following conditions require ventilation:

- In a room having a ceiling height of less than 16 feet (5 m).
- In confined spaces or where the welding space contains partitions, balconies, or other structural barriers to the extent that they significantly obstruct cross ventilation.

Mechanical local exhaust ventilation may be supplied by either of the following:

- **Hoods.** Freely movable hoods intended to be placed by the welder as near as practicable to the work being welded and provided with a rate of air-flow sufficient to maintain a velocity in the direction of the hood of 100 linear feet (30 m) per minute in the zone of

welding when the hood is at its most remote distance from the point of welding. The rates of ventilation required to accomplish this control velocity using a 3-inch (7.6-cm)-wide flanged suction opening are shown in the following table (TABLE):

- **Fixed enclosure.** A fixed enclosure with a top and not less than two sides that surround the welding or cutting operations and with a rate of airflow sufficient to maintain a velocity away from the welder of not less than 100 linear feet (30 m) per minute.

### **Ventilation in confined spaces for hazardous materials**

**Air replacement.** All welding and cutting operations carried on in confined spaces shall be adequately ventilated to prevent the accumulation of toxic materials or possible oxygen deficiency. This applies not only to the welder but also to helpers and other personnel in the immediate vicinity. All air replacing that withdrawn shall be clean and respirable.

**Airline respirators.** In circumstances for which it is impossible to provide such ventilation, airline respirators or hose masks approved for this purpose by the National Institute for Occupational Safety and Health (NIOSH) under 42 CFR part 84 must be used.

**Self-contained units.** In areas immediately hazardous to life, a full-face piece, pressure-demand, self-contained breathing apparatus or a combination full-face piece, pressure-demand supplied-air respirator with an auxiliary, self-contained air supply approved by NIOSH under 42 CFR part 84 must be used.

### **Chemical Hazards**

The following metals and chemicals create potentially hazardous conditions while welding or cutting. Personnel working with materials containing these components should receive sufficient warning through signs and training to prevent exposures. In addition to the chemicals described in this FLD, see 29 CFR 1910.252-255 or 29 CFR 1926.350 for hazards associated with zinc, beryllium, mercury, and stainless steel.

**Cadmium.** Brazing (welding) filler metals containing cadmium in significant amounts shall carry the following notice on tags, boxes, or other containers:

<p style="text-align: center;"><b>WARNING</b></p> <p style="text-align: center;"><b>Contains Cadmium - Poisonous Fumes May Be Formed on Heating</b></p> <p>Do not breathe fumes. Use only with adequate ventilation such as fume collectors, exhaust ventilators, or air-supplied respirators. See ANSI Z49.1-1967.</p> <p>If chest pain, cough, or fever develops after use, call a physician immediately.</p>
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**Fluorine Compounds.** Brazing and gas welding fluxes containing fluorine compounds shall have a cautionary wording to indicate that they contain fluorine compounds. One such cautionary wording recommended by the American Welding Society for brazing and gas welding fluxes reads as follows:

**CAUTION**

**Contains Fluorides**

This flux when heated gives off fumes that may irritate eyes, nose and throat.

1. Avoid fumes - use only in well-ventilated spaces.
2. Avoid contact of flux with eyes or skin.
3. Do not take internally.

In confined spaces, welding or cutting involving fluxes, coverings, or other materials that contain fluorine compounds shall be done in accordance with information listed above. A fluorine compound is one that contains fluorine, as an element in chemical combination, not as a free gas.

The need for local exhaust ventilation or airline respirators for welding or cutting in other than confined spaces will depend upon the individual circumstances. However, experience has shown such protection to be desirable for fixed-location production welding and for all production welding on stainless steels. Where air samples taken at the welding location indicate that the fluorides liberated are below the maximum allowable concentration, such protection is not necessary.

**Lead.** In confined spaces, welding involving lead-base metals or lead-bearing materials, including paint, shall be done in accordance with paragraph listed above.

**Degreasing or Cleaning with Chlorinated Hydrocarbons.** Degreasing and other cleaning operations involving chlorinated hydrocarbons shall be performed in a location that prevents vapors generated by these operations from reaching or being drawn into the atmosphere surrounding any welding operation. In addition, trichloroethylene and perchlorethylene should be kept out of atmospheres penetrated by the ultraviolet radiation of gas-shielded welding operations.

# Inspection Checklist Welding, Cutting and Brazing Module

## 1. General

INSPECTION ITEM		COMMENTS	
1.1	<p>Have they obtained the local facility hot work permits?</p> <p><b>Hot work includes electric or gas welding, cutting or brazing operations. Designated areas should be established in maintenance shops and/or production areas if hot work is routinely performed.</b></p>	YES <input type="checkbox"/> NO <input type="checkbox"/> NA <input type="checkbox"/>	
1.2	<p>Has the facility developed procedures for hot work operations?</p>	YES <input type="checkbox"/> NO <input type="checkbox"/> NA <input type="checkbox"/>	
1.3	<p>Has the facility designated an individual responsible for authorizing hot work operations in areas not specifically designed for such operations?</p> <p><b>The individual assigned this responsibility should be knowledgeable in the hazards presented by welding and the engineering control methods available.</b></p>	YES <input type="checkbox"/> NO <input type="checkbox"/> NA <input type="checkbox"/>	
1.4	<p>Does the designated individual inspect the hot work area prior to permit issuance?</p>	YES <input type="checkbox"/> NO <input type="checkbox"/> NA <input type="checkbox"/>	
1.5	<p>Does the hot work permit contain all required information?</p> <p><b>The hot work permit should contain the following information:</b></p> <ul style="list-style-type: none"> <li>• The effective time and date</li> <li>• The place of use</li> <li>• The hours during which the source of ignition may be used, not to exceed 24 hours</li> <li>• The specific location or piece of equipment where the source of ignition will be used</li> <li>• The nature of sources of ignition</li> <li>• Any special precautions or limitations to be observed before, during or after the use of the source of ignition, including the need for fire watch.</li> </ul>	YES <input type="checkbox"/> NO <input type="checkbox"/> NA <input type="checkbox"/>	
1.6	<p>Are welders or cutters trained in the safe operation of their equipment and the safe use of the process?</p>	YES <input type="checkbox"/> NO <input type="checkbox"/> NA <input type="checkbox"/>	
1.7	<p>Is hot work prohibited in areas not authorized by management and in areas near the storage of readily ignitable materials?</p> <p><b>Readily ignitable materials include bulk sulfur, baled paper and cotton.</b></p>	YES <input type="checkbox"/> NO <input type="checkbox"/> NA <input type="checkbox"/>	

# Inspection Checklist Welding, Cutting and Brazing Module

## 1. General

INSPECTION ITEM		COMMENTS	
1.8	Are combustible materials on the floor swept clean for a radius of 35 feet around the hot work operation?  <b>Combustible materials include paper clippings, wood shavings and textile fibers.</b>	YES <input type="checkbox"/> NO <input type="checkbox"/> NA <input type="checkbox"/>	
1.9	Are combustible floors kept wet, covered with damp sand or protected by fire-resistant shields when hot work is performed?  <b>An appropriate method to prevent a combustible floor from ignition must be provided.</b>	YES <input type="checkbox"/> NO <input type="checkbox"/> NA <input type="checkbox"/>	
1.10	Are combustible materials relocated at least 35 feet from the work site?  <b>If combustible materials cannot be relocated, they shall be protected with flameproof covers or other suitable curtains or guards.</b>	YES <input type="checkbox"/> NO <input type="checkbox"/> NA <input type="checkbox"/>	
1.11	Are guards used to confine heat, sparks and slag when the object to be welded cannot be moved?	YES <input type="checkbox"/> NO <input type="checkbox"/> NA <input type="checkbox"/>	
1.12	Are precautions taken to protect combustible materials on the other side of floor or wall openings?  <b>Precautions may include moving combustible materials or protecting them.</b>	YES <input type="checkbox"/> NO <input type="checkbox"/> NA <input type="checkbox"/>	
1.13	Are ducts and conveyor systems that might carry sparks to other areas shut down?  <b>Ducts and conveyors can transport sources of ignition if allowed to remain operational. This also includes vent pipes and plenums that move air through natural convection.</b>	YES <input type="checkbox"/> NO <input type="checkbox"/> NA <input type="checkbox"/>	
1.14	Are fire-resistant shields or guards used to prevent ignition when hot work is performed near walls, partitions, ceilings, or roofs of combustible construction?	YES <input type="checkbox"/> NO <input type="checkbox"/> NA <input type="checkbox"/>	
1.15	Are combustibles relocated if hot work is performed on metal walls, partitions, ceilings or roofs adjacent to those combustibles?  <b>A fire watch must be provided if the combustibles are not relocated.</b>	YES <input type="checkbox"/> NO <input type="checkbox"/> NA <input type="checkbox"/>	
1.16	Is hot work prohibited on metal components in contact with combustible walls, partitions, ceilings or roofs that are in close enough proximity to cause ignition by conduction?  <b>Metal will conduct and radiate heat and may serve as an ignition source if temperatures are high enough.</b>	YES <input type="checkbox"/> NO <input type="checkbox"/> NA <input type="checkbox"/>	

# Inspection Checklist Welding, Cutting and Brazing Module

## 1. General

INSPECTION ITEM		COMMENTS
1.17 Is suitable fire extinguishing equipment available and ready for use while hot work is being performed?  <b>The appropriate fire extinguisher should be available depending upon the most likely anticipated fire type.</b>	YES <input type="checkbox"/> NO <input type="checkbox"/> NA <input type="checkbox"/>	
1.18 Are fire watchers provided when appropriate?  <b>Fire watchers must be provided whenever:</b> <ul style="list-style-type: none"> <li>• A major fire might develop</li> <li>• An appreciable amount of combustible material is within 35 feet of hot work</li> <li>• Wall or floor openings within a 35 feet radius may expose combustible material in adjacent areas include concealed spaces in walls or floors</li> <li>• Combustible materials are adjacent to the opposite side of metal partitions, walls, ceilings, or roofs and are likely to be ignited by the conduction of or radiation of heat.</li> </ul>	YES <input type="checkbox"/> NO <input type="checkbox"/> NA <input type="checkbox"/>	
1.19 Are fire watchers trained in the use of fire extinguishing equipment?  <b>Fire watchers must be trained in the use of fire extinguishers, fire hoses and other related equipment.</b>	YES <input type="checkbox"/> NO <input type="checkbox"/> NA <input type="checkbox"/>	
1.20 Are fire watchers familiar with the method of sounding an alarm in the event of a fire?  <b>Confirm that individuals identified as fire watchers know how to sound an alarm if a fire occurs.</b>	YES <input type="checkbox"/> NO <input type="checkbox"/> NA <input type="checkbox"/>	

## 2. Oxygen-Fuel Hot Work

INSPECTION ITEM		COMMENTS	
2.1	Are hoses used for fuel and oxygen easily distinguishable from each other?  <b>Red is generally accepted as the color for fuel gas while green is used for oxygen.</b>	YES <input type="checkbox"/> NO <input type="checkbox"/> NA <input type="checkbox"/>	
2.2	Are assurances made to ensure oxygen and fuel gas hoses are not interchangeable?  <b>Hose connections should prevent the interchange of oxygen and fuel gas hoses.</b>	YES <input type="checkbox"/> NO <input type="checkbox"/> NA <input type="checkbox"/>	
2.3	Do hoses for oxygen-fuel gas service meet requirements?  <b>Verify that hoses meet the specifications for Rubber Welding Hose, 1979, Rubber Manufacturers Association.</b>	YES <input type="checkbox"/> NO <input type="checkbox"/> NA <input type="checkbox"/>	
2.4	If tape is used to bind parallel lengths of oxygen and acetylene hoses, is the amount of tape limited to 4 inches of tape for every 12 inches of hose?  <b>Inspect hoses and verify that tape covers less than 33 percent of the length of the hose assembly.</b>	YES <input type="checkbox"/> NO <input type="checkbox"/> NA <input type="checkbox"/>	
2.5	Do hose connections meet design requirements?  <b>Hose connections must comply with the Standard Connections for Regulator Outlets, Torches and Fitted Hose for Welding and Cutting Equipment, Compressed Gas Association, Pamphlet E-1-1980.</b>	YES <input type="checkbox"/> NO <input type="checkbox"/> NA <input type="checkbox"/>	
2.6	Are hose connections fastened in a manner to withstand normal operating pressures?  <b>Connections shall be capable of withstanding twice the pressure to which they are normally subjected to while in service but in no case less than 300 pounds per square inch (psi).</b>	YES <input type="checkbox"/> NO <input type="checkbox"/> NA <input type="checkbox"/>	
2.7	Are hose, cylinder and regulator connections kept free of grease and oil?  <b>Equipment should not be handled with oily hands, gloves or greasy materials. Oxygen in combination with oil and/or grease can ignite spontaneously.</b>	YES <input type="checkbox"/> NO <input type="checkbox"/> NA <input type="checkbox"/>	
2.8	Are hoses inspected for damage at the beginning of each work shift?	YES <input type="checkbox"/> NO <input type="checkbox"/> NA <input type="checkbox"/>	
2.9	Are hoses subjected to flashback or which show evidence of severe wear or damage taken out of service and tested?  <b>Hoses must be able to hold twice the normal pressure to which it is subject, but in no case less than 300 psi.</b>	YES <input type="checkbox"/> NO <input type="checkbox"/> NA <input type="checkbox"/>	



## 2. Oxygen-Fuel Hot Work

INSPECTION ITEM	COMMENTS
2.10 Are hoses showing evidence of leaks, burns, and defects taken out of service and repaired or replaced?  <b>Determine the process of removing and replacing faulty hoses.</b>	YES <input type="checkbox"/> NO <input type="checkbox"/> NA <input type="checkbox"/>
2.11 Are boxes used for the storage of gas hoses ventilated?	YES <input type="checkbox"/> NO <input type="checkbox"/> NA <input type="checkbox"/>
2.12 Is the mixing of fuel and air or oxygen prior to the burner in a standard torch or blowpipe prohibited?  <b>Confirm that gas and air or oxygen is mixed at the torch burner. Pre-mixing of the fuel and air or oxygen in the hose, within the torch or other location is prohibited.</b>	YES <input type="checkbox"/> NO <input type="checkbox"/> NA <input type="checkbox"/>
2.13 Is backflow protection provided to prevent oxygen from flowing into the fuel-gas system or fuel from flowing into the oxygen system?  <b>The backflow device should be installed at each point at which gas is withdrawn from the permanent piping either upstream or downstream of the shutoff valves.</b>	YES <input type="checkbox"/> NO <input type="checkbox"/> NA <input type="checkbox"/>
2.14 Is the use of acetylene limited to pressures less than 15 psi?	YES <input type="checkbox"/> NO <input type="checkbox"/> NA <input type="checkbox"/>
2.15 Is the use of liquid acetylene prohibited?	YES <input type="checkbox"/> NO <input type="checkbox"/> NA <input type="checkbox"/>
2.16 Are pressure-reducing devices (regulators) provided for oxygen and fuel gas sources?  <b>Regulators must be specific for oxygen and so marked. Shut off valves must be used on fuel-gas sources with the exception of low-pressure air-gas torches used with small cylinders. In the latter situation, shut-off valves are not required on the torch.</b>	YES <input type="checkbox"/> NO <input type="checkbox"/> NA <input type="checkbox"/>
2.17 Are welding fuel-gas cylinders, including liquefied gases stored and shipped with the valve end up?	YES <input type="checkbox"/> NO <input type="checkbox"/> NA <input type="checkbox"/>
2.18 Are welding fuel-gas cylinders handled carefully during storage, transport and use?	YES <input type="checkbox"/> NO <input type="checkbox"/> NA <input type="checkbox"/>
2.19 Are cylinders cracked before connecting them to a regulator?  <b>Cracking cylinders involves opening a valve slightly to clear the valve of dust or dirt. Fuel-gas cylinders must never be opened near potential sources of ignition.</b>	YES <input type="checkbox"/> NO <input type="checkbox"/> NA <input type="checkbox"/>

## 2. Oxygen-Fuel Hot Work

INSPECTION ITEM		COMMENTS
2.20 Is gas released from a regulator before it is removed from a gas cylinder?  <b>Determine if gas is bled from the regulator before it is removed from a cylinder. Removal of a regulator from a fuel gas cylinder without bleeding can release a short blast of highly explosive gases.</b>	YES <input type="checkbox"/> NO <input type="checkbox"/> NA <input type="checkbox"/>	
2.21 Are acetylene cylinders opened no more than one and one-half turns of the spindle?	YES <input type="checkbox"/> NO <input type="checkbox"/> NA <input type="checkbox"/>	
2.22 Are torches inspected at the beginning of each working shift?	YES <input type="checkbox"/> NO <input type="checkbox"/> NA <input type="checkbox"/>	
2.23 Are clogged torch tip openings cleaned with suitable equipment?  <b>Suitable equipment includes the use of cleaning wires and drills when the torch is not connected to the fuel-gas supply.</b>	YES <input type="checkbox"/> NO <input type="checkbox"/> NA <input type="checkbox"/>	
2.24 Are torches lighted with friction lighters or other appropriate devices?	YES <input type="checkbox"/> NO <input type="checkbox"/> NA <input type="checkbox"/>	
2.25 Are cylinders kept far enough away from welding or cutting operations to prevent sparks, hot slag, or flame from reaching them?	YES <input type="checkbox"/> NO <input type="checkbox"/> NA <input type="checkbox"/>	
2.26 Does the facility prevent the mixing and/or refilling of gas cylinders?  <b>Only the gas supplier is permitted to refill cylinders and mix gases.</b>	YES <input type="checkbox"/> NO <input type="checkbox"/> NA <input type="checkbox"/>	
2.27 Are cylinders of oxygen or fuel gas prohibited from being taken into confined spaces?	YES <input type="checkbox"/> NO <input type="checkbox"/> NA <input type="checkbox"/>	
2.28 Are gas cylinders shut off when operations are suspended for any substantial period of time?	YES <input type="checkbox"/> NO <input type="checkbox"/> NA <input type="checkbox"/>	
2.29 Are appropriate workers warned regarding the location of hot metal upon completion or discontinuance of welding operations?  <b>Signs are an appropriate warning method.</b>	YES <input type="checkbox"/> NO <input type="checkbox"/> NA <input type="checkbox"/>	

### 3. Electric Hot Work

INSPECTION ITEM		COMMENTS	
3.1	Is electric welding equipment properly installed and maintained?	YES <input type="checkbox"/> NO <input type="checkbox"/> NA <input type="checkbox"/>	
3.2	Are welding areas enclosed in a booth or surrounded with noncombustible screens?  <b>Booths and screen assist with local exhaust ventilation and reduce the amount of injurious light radiation. These surfaces should be constructed of or painted with low reflectivity material.</b>	YES <input type="checkbox"/> NO <input type="checkbox"/> NA <input type="checkbox"/>	
3.3	Are welding machines blocked to prevent accidental movement?  <b>Ensure that welding machines equipped with wheels are blocked to prevent movement while in operation.</b>	YES <input type="checkbox"/> NO <input type="checkbox"/> NA <input type="checkbox"/>	
3.4	Are welding machines shut off when operations are suspended for any substantial period of time?	YES <input type="checkbox"/> NO <input type="checkbox"/> NA <input type="checkbox"/>	
3.5	Do welders provide other workers warning regarding the location of hot metal upon completion or discontinuance of welding operations?  <b>The use of signs is an appropriate method.</b>	YES <input type="checkbox"/> NO <input type="checkbox"/> NA <input type="checkbox"/>	
3.6	Does the facility ensure that only manual electrode holders intended for arc welding and cutting capable of handling the maximum current are used?	YES <input type="checkbox"/> NO <input type="checkbox"/> NA <input type="checkbox"/>	
3.7	Are arc welding and cutting cables used which are insulated, flexible and capable of handling the maximum current?	YES <input type="checkbox"/> NO <input type="checkbox"/> NA <input type="checkbox"/>	
3.8	Are welding and cutting cables free of repair or splice within 10 feet of the electrode holder?	YES <input type="checkbox"/> NO <input type="checkbox"/> NA <input type="checkbox"/>	
3.9	Are welding and cutting cables free of damage and broken insulation?	YES <input type="checkbox"/> NO <input type="checkbox"/> NA <input type="checkbox"/>	
3.10	Are ground return cables used which have a current-carrying capacity equal to or exceeding the total maximum output capacities of the welding or cutting units served?	YES <input type="checkbox"/> NO <input type="checkbox"/> NA <input type="checkbox"/>	
3.11	Are arc welding and cutting machine frames grounded?  <b>Grounding must be provided through a third wire in the cable containing the circuit conductor or through a separate wire at the source of the current.</b>	YES <input type="checkbox"/> NO <input type="checkbox"/> NA <input type="checkbox"/>	

### 3. Electric Hot Work

INSPECTION ITEM		COMMENTS	
3.12	Are electrodes removed and holders moved into place when left unattended?	YES <input type="checkbox"/> NO <input type="checkbox"/> NA <input type="checkbox"/>	
3.13	Are hot electrode holders prohibited from being dipped in water?  <b>Dipping electrodes in water presents an electrocution hazard and should not be done.</b>	YES <input type="checkbox"/> NO <input type="checkbox"/> NA <input type="checkbox"/>	
3.14	Is the control apparatus of arc welding machines enclosed except for operating wheels, levels and handles?	YES <input type="checkbox"/> NO <input type="checkbox"/> NA <input type="checkbox"/>	
3.15	Are input power terminals, top change devices and live metal parts connected to input circuits enclosed and accessible only through the use of insulated tools?	YES <input type="checkbox"/> NO <input type="checkbox"/> NA <input type="checkbox"/>	
3.16	Are workers provided with protection against shock when welding in wet or high humidity conditions?	YES <input type="checkbox"/> NO <input type="checkbox"/> NA <input type="checkbox"/>	
3.17	For resistance welding operations, is all suspended portable welding gun equipment provided with a support system capable of supporting the total shock load in the event of failure of any component of the support system?	YES <input type="checkbox"/> NO <input type="checkbox"/> NA <input type="checkbox"/>	
3.18	For resistance welding operations, is the movable holder mechanism designed so as to present no shear points to the fingers laced on the operating movable holder where it enters the gun frame?  <b>Guarding must be present if this design feature is not provided.</b>	YES <input type="checkbox"/> NO <input type="checkbox"/> NA <input type="checkbox"/>	
3.19	For resistance welding operations using multi-spot welding machines, are safety emergency stop buttons provided at each operator's position?  <b>At least one emergency stop button should be provided at each operator's position.</b>	YES <input type="checkbox"/> NO <input type="checkbox"/> NA <input type="checkbox"/>	
3.20	Are periodic inspections of resistance welding equipment conducted by a qualified individual?  <b>A qualified individual is trained in the operation and maintenance of the resistance welder being used.</b>	YES <input type="checkbox"/> NO <input type="checkbox"/> NA <input type="checkbox"/>	
3.21	Does the facility maintain a certification record that the inspection was completed?	YES <input type="checkbox"/> NO <input type="checkbox"/> NA <input type="checkbox"/>	

### 3. Electric Hot Work

INSPECTION ITEM	COMMENTS	
3.22 Does the certification record contain all required information?  <b>Verify that inspection records contain:</b> <ul style="list-style-type: none"> <li>• The date of the inspection</li> <li>• The signature of the person performing the inspection</li> <li>• The serial number or other identifier of the equipment inspected</li> <li>• The inspection results.</li> </ul>	YES <input type="checkbox"/> NO <input type="checkbox"/> NA <input type="checkbox"/>	
3.23 Are chlorinated solvents prohibited from being used within 200 feet of the hot work area?  <b>Chlorinated solvents, when subjected to the ultraviolet energy of welding process can form phosgene.</b>	YES <input type="checkbox"/> NO <input type="checkbox"/> NA <input type="checkbox"/>	
3.24 Are surfaces prepared with chlorinated solvents allowed to thoroughly dry before being welded on?	YES <input type="checkbox"/> NO <input type="checkbox"/> NA <input type="checkbox"/>	
3.25 Does the facility provide hot work employees with skin protection to prevent burns and damage?  <b>Skin protection includes the use of clothing, gloves and helmets to protect skin from ultraviolet radiation.</b>	YES <input type="checkbox"/> NO <input type="checkbox"/> NA <input type="checkbox"/>	
3.26 Are employees provided with respiratory protection or is local exhaust ventilation used if inert-gas metal-arc welding is performed on stainless steel?	YES <input type="checkbox"/> NO <input type="checkbox"/> NA <input type="checkbox"/>	

## HOT WORK PERMIT

The Site Manager and the Field Safety Officer have surveyed the site and found the following Hot Work conditions exist and will require permitting at \_\_\_\_\_

CONDITION	YES	NO	CONDITION	YES	NO
Welding			Electrical equipment, fixed		
Cutting			Electrical equipment, portable		
Use of power tools			Electrical equipment, hand-held		
Space heaters			Others		

<b>PRE-WORK CHECKLIST</b> All items must be completed for Permit to be valid	YES	NO	N/A
Work area inspected by FSO prior to hot work beginning?			
Fire-watch established? Name: _____			
Fire extinguisher appropriate for media/readily accessible?			
Work area clear of all trash and combustible debris/equipment properly grounded?			
Area in which hot work is to be performed has been monitored for combustible atmosphere?			
Will combustible gas indicator(s) be used constantly during hot work?			
If no, why?:			
List additional personal protective equipment worn:			
Welding or cutting on closed systems prohibited?			
Closed system cutting procedures?			

Date \_\_\_\_/\_\_\_\_/\_\_\_\_

Time \_\_\_\_:

Permit Expiration Time \_\_\_\_:

Certification of FSO that hot work may commence

Yes ☐ No ☐ N/A ☐

Signature: \_\_\_\_\_

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HOT WORK TEAM SIGN-OFF		
I/we have read and understand the terms of the above Hot Work Permit.		
NAME (PLEASE PRINT CLEARLY)	SIGNATURE	DATE/TIME (24 HR.)

CERTIFICATION OF FSO THAT THE HOT WORK AREA HAS BEEN SHUT DOWN AND THAT NO IGNITION POTENTIAL EXISTS: \_\_\_\_\_

Time: \_\_\_\_\_. Must be re-inspected and signed **no earlier** than 30 minutes **after** all hot work has been completed.

## GENERAL

Steam is often used in equipment decontamination processes at hazardous waste sites. Steam cleaning equipment has the same hazards as facility steam lines in that there are hot surfaces to contact, the steam itself is a thermal burn hazard, steam cleaners are often augmented by high pressure, and in enclosed areas, steam may displace oxygen and increase heat stress risk.

## REFERENCES

Related FLD OPS:

*FLD01 – Noise Protection*

*FLD03 – Hot Processes - Steam*

*FLD05 – Heat Stress Prevention and Monitoring*

*FLD06 – Cold Stress*

## PROCEDURE

### Recognition and Risk Assessment

In the planning stages of a project and safety plan, the potential for injuries from steam must be considered as a physical hazard in the site-specific Health and Safety Plan (HASP). Risk assessment can be accomplished in the development stages of a project by listing in the HASP, the most likely steam injuries which may occur. The SHSC must make decisions on the proper safety procedures and recommend them to the site manager. Each worker must evaluate the risk associated with his or her work and be actively alert to these hazards. Any site worker may stop work if safety procedures are not followed or the risk is too great.

High-pressure water washing (or cleaning, jetting) is defined as the use of high-pressure water, with or without the addition of other liquids or solid particles, to remove unwanted matter from various surfaces, where the pressure of the liquid jet exceeds 1000 PSIG at the orifice (or nozzle). The lower limit of 1000 PSIG does not mean that pressures below 1000 PSIG cannot cause injury or require any less attention to the principal of these recommended practices. Adequate precautions, similar to those of these recommended practices, are required at all pressures. As a guideline, these recommended practices are applicable where the product of pressure times flow exceeds 2000 PSIG.

Injuries caused by the impact of a water jet may appear insignificant and give little indication of the extent of the injury beneath the skin and the damage to deeper tissues. Large quantities of water may have punctured the skin, flesh, and organs through a very small hole that may not bleed. Personnel injured by a pressure washer require immediate hospital attention, and medical staff must be informed of the cause of the injury. To ensure that this is not overlooked, medical staff should be advised that, in previous cases of water jet punctures, unusual infections from micro-aerophilic organisms occurring at lower temperatures have been reported. These may be gram-negative pathogens such as those found in sewage. Bacterial swabs and blood cultures may, therefore, be helpful.

This operating procedure provides only minimum general requirements. In addition the equipment manufacturer's manual should be read and followed.



## **Prevention and Protection Programs**

### **Pressure Washing Equipment Requirements**

Automatic pressure relief:	The system shall be equipped with an automatic pressure relief device on the discharge side of the pump, adjusted so that the manufacturer's maximum allowable system pressure is not exceeded.
Pressure gauge:	The system shall be equipped with a gauge to indicate the pressure being developed.
Electrical controls:	All electrical controls shall be either fail safe, low-voltage, or protected with an approved ground fault circuit interrupter.
Operator controls:	The on – off control (trigger) used by the operator to control the flow of high pressure water to the nozzle shall include a "dead man" shut-off feature which automatically stops the flow of high-pressure water to the nozzle whenever the operator lets go of the control.

### **Personal Protection and Equipment Requirements**

The following personal protective equipment is to be available and worn as necessary, based on HASP requirements and/or direction of the SHSC. Additional equipment may be necessary if chemical or other hazards are present.

Whole Body:	Splash protection. Liquid/chemical resistant suits may be necessary based on HASP requirements.
Head:	Hard hat, as necessary
Eyes and Face:	Face shield
Foot:	Waterproof American National Standards Institute (ANSI)-approved safety boots
Hearing:	Ear plugs or ear muffs, as necessary.

### **Training**

Only trained (experienced) personnel shall operate high-pressure washing equipment, and supervise the training of new operators. Where equipment is rented or newly purchased and no one on the project team has prior experience with this equipment, the vendor shall be required to provide training in the proper use of the equipment. Training should include the following:

**Cutting Action** – Cutting action and potential hazard to the human body shall be demonstrated through the use of the equipment (e.g., cut through a piece of lumber, concrete block)

**Personal Protective Equipment** – The minimum required personal protective equipment shall be explained.

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System Operation – The operation of the system **shall** be explained, including potential problems and proper corrective actions.

Control Devices – The operation of all control devices shall be explained, particularly pressure control and relief devices. The importance of not tampering with any control devices shall be stressed, as well as the importance of keeping them functional.

Hose – The proper method of connecting hoses shall be explained, including laying out without kinks, protection from excessive wear, and proper methods for using couplings and fittings.

Stance – The proper stance for sound footing shall be demonstrated.

Proficiency – Personnel being trained shall demonstrate knowledge in the safe use of the equipment through practical application under the direction of the trainer.

### **Operational Rules**

Never operate the equipment above the manufacturer's rated pressure maximum.

Increase pressure slowly until required working pressure is reached.

Always rope off the area to be cleaned.

Always be aware of nozzle location. Never point nozzle at a person. Remember that a water jet can puncture splash suits, safety boots and other protective clothing.

## **FLD 38      HAND AND POWER HAND TOOLS**

### **INTRODUCTION**

Injuries from hand tools are often caused by improper use, using the wrong tool for the job, or from using a defective tool. Workers often assume that they know how to use a common hand tool. Working with something other than the simplest non-powered hand tools shall be performed only by those persons competent or qualified because of formal training or documented experience.

Like all tools, hand tools must be maintained properly for effective use and safety. This Field Operating Procedure describes general safety guidelines for the four major categories of hand tools: cutting tools, torsion tools, impact tools and power tools. Referenced by 29CFR1926 Subpart I and 29CFR1910 Subpart P.

### **GENERAL SAFETY RULES – APPLICABLE TO USE OF ALL TOOLS**

- Keep the work area clear of clutter.
- Keep work area properly illuminated.
- Maintain and keep tools sharpened, oiled and stored in a safe, dry place.
- Wear ear and eye protection when cutting, sawing, drilling, or grinding.
- Supervisor should instruct everyone using equipment on safe procedures before they use them.
- Inspect tools, cords, and accessories regularly and document any repairs.
- Repair or replace problem equipment immediately.
- Use three-prong (3) electric plugs, double insulated tools, and safety switches.
- Machine guards must be in-place and not removed during equipment operation.
- Do not alter factory-supplied safety features on tools.
- Install and repair equipment only if you are qualified.
- Use the right tool for the job; for instance, do not use a screwdriver as a hammer.
- Carry a sharp tool pointed downward or place in a tool belt or toolbox.
- Protect a sharp blade with a shield.
- Store tools in drawers or chests with cutting edge down.
- When using power tools, wear long hair in a protective manner, do not wear jewelry or loose clothing, use safety glasses, respiratory protection, hard hats, etc., as needed/specified by the manufacturer. Note that protective gloves should not be worn when operating powered woodworking tools because of the possibility of the work piece snagging the glove and pulling the hand to the cutting surface.

- All hand-held power-driven tools must be equipped with "dead-man" control, so power will automatically be cut off upon release of the control by the operator.
- Never leave a running tool unattended.
- All workers using hand and power tools must be properly trained which is to be documented.
- Tools of a non-sparking material must be used if fire/explosion hazards exist.
- All fuel-operated tools shall be stopped and allowed to cool prior to being refueled, serviced, or maintained, and proper venting exercised when used in enclosed spaces.
- Power-grinding machines shall have proper grounding. Work rests must be kept at a distance not to exceed 1/8 inch from the wheel surface.
- All persons using abrasive wheels shall use approved eye-protective devices.
- Hand held grinders shall have appropriate wheel guards in place during operation.
- Train personnel to recognize that tasks involving lifting, repetitive motion, excess pressure, vibration, awkward positions, and remaining stationary for prolonged periods and work in cold conditions increase the risk of musculoskeletal injury. There are procedures for avoiding or minimizing risk such as: using mechanical devices for lifting, following procedures in FLD 12 when manual lifting is necessary, using shock absorbing gloves when using vibrating tools are used, choosing tools that reduce gripping force and align joints in a neutral position or holding tools in an ergonomically neutral position, taking breaks or alternating repetitive jobs, and following procedures in FLD 6.
- Hand tools such as chisels and punches, which develop mushroomed heads during use must be taken out of service and reconditioned by qualified persons or replaced as necessary.
- Broken or fractured handles on hammers, axes and similar equipment must be replaced promptly.
- Worn or bent wrenches must be replaced.
- Handles designed to be used on files and similar tools must be used.
- Jacks must be checked periodically to ensure they are in good operating condition

## **TORSION TOOLS**

Torsion tools are used to grip, fasten, and turn. These include wrenches, pliers, screwdrivers, vises, and clamps. There is a variety of each type of these tools. Selection is very important. Here are a few safety precautions for common torsion tools:

- Wrenches should always be pulled and not pushed. Pushing a wrench can cause a loss of control if there is a sudden release of pressure. A short, steady pull should be used rather than

quick, jerky motions. Where available, use a socket wrench instead of an adjustable or open-ended wrench. Socket wrenches are generally easier to control, are more convenient, and are less likely to damage a bolt or nut. When using an adjustable wrench, the pressure should be applied to the fixed jaw

- Pipe wrenches can easily slip on pipes or fittings, causing injury. To prevent slipping, make sure that the pipe or fitting is clean and the wrench jaws are sharp and kept clean of oil and debris.
- Pliers should never be substituted for a wrench. They do not have the same gripping power and can easily slip on a tight object. When using cutting pliers, the object being cut can fly off and cause injury. Wear safety glasses when cutting with pliers.
- Screwdrivers are often misused. They should not be used for prying, as punches, or wedges. These misuses can damage the head of the screwdriver. A dull tip can cause the screwdriver to slip. The tip must be flat at the tip and tapered for a snug fit on the screw.
- When using vises, make sure that the vise is bolted solidly to the base. When cutting material in a vise, try to cut as close to the vise as possible to minimize vibration.
- Oil vises regularly.

#### **SCREWDRIVERS:**

- Most screwdrivers are not designed to be used on electrical equipment. Use an insulated screwdriver.
- Do not hold an object in the palm of one hand and press a screwdriver into it; place the object on a bench or a table.
- Never hammer with a screwdriver.
- Check for broken handles, bent blade, etc.
- Select a screwdriver of the proper size to fit the screw.
- Screwdrivers with a split or splintered handle shall not be used.
- The point shall be kept in proper shape with a file or grinding wheel.
- Screwdrivers shall not be used as a substitute punch, chisel, nail-puller, etc.

#### **PLIERS:**

- Do not use pliers as a substitute for hammers or wrenches.
- Use insulated pliers when doing electrical work.
- Inspect installation frequently to make certain that it is free of breaks or cracks.

- Pliers shall be kept free from **grease** and oil and- the teeth or cutting edges shall be kept clean and sharp.
- The fulcrum pin, rivet or bolt **shall** be snug but not tight.

#### **WRENCHES:**

- Select the correct size of wrench for the job.
- Never use a pipe wrench as a wrench handle extension.
- Too much leverage can ruin a tool and cause injury.
- To avoid sudden slips stand in a balanced position and always pull on the wrench instead of pushing against the fixed jaw.
- Only wrenches in good condition shall be used; a bent wrench, if straightened, has been weakened and shall not be used.
- Watch for sprung jaws on adjustable wrenches.
- Always pull toward yourself, never push, since it is easier to brace against a sudden lunge toward you should the tool slip or break.

#### **IMPACT TOOLS**

Impact tools include various types of hammers like riveting hammers, carpenter's claw hammers, and sledgehammers. The main hazard associated with all these tools is damage to the hands and arms. The following safety procedures should be employed when using hammers:

- The handle shall be securely fitted and suited for the type of job and type of hammerhead. The striking face of the hammer shall be kept well dressed according to the application.
- The handle shall be smooth and free of oil to prevent slippage.
- Safety goggles shall be worn at all times when hammering to protect from flying nails, wood chips, and metal or plastic fragments.
- To properly drive a nail, hold the hammer near the end of the handle and start off with a light blow. Increase power after the nail is set.
- To avoid chipping or spalling of the hammerhead, use the lightest swing possible, hammer straight and not on an angle. Inspect the head of the hammer for potential chipping and spalling.

#### **HAMMERS:**

- Use the correct hammer for the type of work to be done.
- Have an unobstructed swing when using a hammer and watch for overhead interference.

- Check for defects before using.
- The head of a hammer shall be wedged securely and squarely on the handle and neither the head nor the handle shall be chipped or broken.

## **CUTTING TOOLS**

The main hazard associated with cutting tools is tool slippage. A dull tool or poor tool technique can cause a slip, which can redirect the cutting part of the tool toward the body. In addition, a sudden release or change in the force applied to a tool can throw the user off balance, possibly falling into another object, which may cause injury. To prevent slippage, tools shall be kept sharp and handled in such a way that, if a slip occurs, the direction of force will be away from the body. In addition, cutting along the grain of a material can help prevent changes in the pressure applied to the tool, thereby preventing slippage.

### **CHISELS:**

- Always wear safety goggles or a face shield when using a chisel.
- Drive wood chisel outward and away from your body.
- Do not use chisels to pry.
- Keep edges sharp for most effective work and protect when not in use.

### **KNIVES:**

- Always cut away from the body.
  - Keep hands and body clear of the knife stroke.
  - Use a locking blade knife when possible.
  - Keep blades sharp.
- Knives and other sharp or edged tools must be maintained in proper condition. A sharp edged tool, used properly, is safer than a dull or improperly maintained tool.
  - When not in immediate use edged tools must be properly secured via, sheathing, closing, capping or covering.
  - Any task involving the use of an edged tool must be properly evaluated, alternatives to edged tools reviewed and training in the proper use, maintenance and handling verified by management and/or the site safety officer.
  - Knives, box cutters or like tools will not be authorized for cutting plastic wire ties or tubing. Use appropriately shaped and sized wire cutters or snips.

- Remove knives from carry on luggage and place in checked baggage.

## POWERED TOOLS

- Portable power tools shall be carefully inspected before use and shall be kept repaired.
- Switches and plugs must operate properly, and the cords must be clean and free from defects.
- Portable powered tools capable of receiving guards and/or designed to accommodate guards shall be equipped with guards to prevent the operator from having any part of his body in the danger zone during the operating cycle.
- Electric powered portable tools with exposed conducting parts shall be grounded. Portable tools protected by an approved system of double insulation, or its equivalent, need not be grounded. Where such an approved system is employed, the equipment shall be distinctively marked.
- Hand-held powered tools of a hazardous nature such as circular saws having a blade diameter greater than two inches, chain saws, percussion tools, drills, tappers, fasteners, drivers, grinders with wheels greater than two inches in diameter, disc sanders, belt sanders, reciprocating saws, saber scroll saws and jig saws with blade shanks greater than one-fourth inch, and other similarly operating powered tools shall be equipped with a constant pressure switch or control ("dead-man switch") that will shut the power off when the pressure is released.
- Portable circular saws having a blade diameter over two inches shall be equipped with guards or hoods which will automatically adjust themselves to the work when the saw is in use, so that none of the teeth are exposed to contact above the work. When withdrawn from the work, the guard shall completely cover the saw to at least the depth of the teeth. The saw shall not be used without a shoe or guide.
- Pneumatic powered portable tools shall be equipped with automatic air shut-off valves that stop the tool when the operators hand is removed. Safety clips, retainers or other effective means shall be installed on pneumatic tools to prevent the tools from accidentally misfiring.
- Abrasive wheels with a diameter of more than two inches shall be used only on machines provided with safety guards. The guards shall cover the spindle end, nut and flange projections. Guards on operations where the work provides a suitable measure of protection to the operator may be so constructed that the spindle end, nut and other flange are exposed.
- Explosive-actuated fastening tools' muzzle ends shall have a protective shield or guard designed to confine any flying fragments or particles. The tool shall be so designed that it cannot be fired unless it is equipped with a protective shield or guard. A Weston Solutions employee is not permitted to use a power-actuated tool until properly trained as prescribed by the manufacturer.



## **EXTENSION CORDS**

See FLD 35, Electric Safety, for requirements and procedures for using extension cords.

## **SPECIALTY TOOLS**

### **Pneumatic Powered Tools**

Tools powered by air must be inspected and maintained as described above. Hose or tubing used to deliver air to pneumatic tools must be used as required and according to procedures in FLD 16, Pressure Systems: Compressed Gas Systems.

### **Powder-Actuated Tools**

- Only employees who have been trained in the operation of the particular tool in use shall be allowed to operate a powder-actuated tool.
- Powder actuated tools shall be tested each day before loading to see that safety devices are in proper working condition. The method of testing shall be in accordance with the manufacturer's recommended procedure.
- Any tool found not in proper working order, or that develops a defect during use, shall be immediately removed from service and not used until properly repaired.
- Personal protective equipment shall be selected in accordance with manufacturer's recommendations and in consideration of the potential hazards of the task.
- Tools shall not be loaded until just prior to the intended firing time. Neither loaded nor empty tools are to be pointed at any employees. Hands shall be kept clear of the open barrel end.
- Loaded tools shall not be left unattended.
- Fasteners shall not be driven into very hard or brittle materials including, but not limited to, cast iron, glazed tile, surface-hardened steel, glass block, live rock, face brick, or hollow tile.
- Driving into materials easily penetrated shall be avoided unless such materials are backed by a substance that will prevent the pin or fastener from passing completely through and creating a flying missile hazard on the other side.
- No fastener shall be driven into a spalled area caused by an unsatisfactory fastening.
- Tools shall not be used in an explosive or flammable atmosphere.

- All tools shall be used with the correct **shield**, guard, or attachment recommended by the manufacturer.
- Powder-actuated tools used by employees shall meet all other applicable requirements of American National Standards Institute, A10.3-1970, Safety Requirements for Explosive-Actuated Fastening Tools.

## FLD 39 ILLUMINATION

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### GENERAL

### REFERENCES

Related FLD OPS:

*FLD08 – Confined Spaces Entry*  
*FLD10 – Manual Lifting and Handling of Heavy Objects*  
*FLD12 – Housekeeping*  
*FLD13 – Structural Integrity*  
*FLD15 – Remote Areas*  
*FLD18 – Using Boats*  
*FLD22 – Heavy Equipment Operation*  
*FLD23 – Cranes/Lifting Equipment Operation*  
*FLD33 – Demolition*  
*FLD38 – Hand and Power Hand Tools*

### PROCEDURE

The minimum lighting level for general construction work areas is 5 foot-candles intensity. Recommended illumination levels for other tasks are listed below.

Foot-Candles	Area of Operation
5	General construction area, indoor: warehousing areas, corridors, hallways, exits, tunnels, shafts and general underground work areas
10	Tunnel and shaft heading when drilling, mucking, or scaling; general construction plant and shops
30	First aid stations, infirmaries, and offices

Revised 11 1999

## **FLD 41      HAND AND EMERGENCY SIGNALS**

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### **GENERAL**

### **PROCEDURE**

### **HAND SIGNALS:**

<b>SIGNAL</b>	<b>MEANING</b>
Hands on top of head	Need assistance
Grip partners wrist or place both hands around partners arm	Leave area immediately.
Thumbs up	OK; I'm all right
Thumbs down	No; Negative
Hand gripping throat	Cannot breath, out of air
Pointed finger on extended arm	Look in that direction
Wave hands over head from side-to-side	Attention; Stand-by for the next signal
Swing hand from direction of person receiving signal to directly overhead and through in circle	Come here
Clenched fist of extended arm	Stop motion
Draw index finger across front of throat	Shut off engine; cut off power

### **EMERGENCY SIGNALS:**

<b>SIGNAL</b>	<b>MEANING</b>
One long sound of the emergency alarm signal	Emergency situation, face safety watch and watch or listen for directions
Pause; followed by a number of short sounds, 1, 2, 3 or 4	Evacuate to the pre-designated emergency meeting place indicated by the number of sounds

Revised 11/1999

## **FLD 44      BIOLOGICAL HAZARDS - BLOODBORNE PATHOGENS EXPOSURE CONTROL PLAN - FIRST AID PROVIDERS**

### **GENERAL**

#### **SCOPE AND APPLICATION**

Bloodborne pathogens are pathogenic microorganisms which may be present in human blood and can cause disease in humans. These pathogens include, but are not limited to hepatitis B virus (HBV) and human immunodeficiency virus (HIV). OSHA requires compliance with 29 CFR 1910.1030, Occupational Exposure to Bloodborne Pathogens Standard, where as a condition of employment, there is known or potential exposure to bloodborne pathogens. A source of occupational exposure may occur when an employee gives First Aid and CPR to an individual who has infectious blood. The occupational exposure occurs when potentially infectious materials come in contact with the employee's eyes, mucous membranes, non-intact skin through cuts and abrasions while administering First Aid and CPR.

Additional sources of exposure are contact with infectious waste found at hazardous waste sites, glassware, needles other sharp objects which have been involved in injuries to personnel resulting in contamination with blood or related bodily fluids and laboratory personnel who may analyze samples containing infectious waste.

WESTON personnel may become engaged in the delivery of First Aid and CPR in the pre-hospital setting. First Aid and CPR duties are often performed in uncontrolled environments, which, due to a lack of time and other factors, do not allow for application of a complex decision-making process to the emergency at hand.

This document serves as WESTON's Exposure Control Plan for First Aid Providers and is intended to assist personnel in making decisions concerning the use of personal protective equipment (PPE) and resuscitation equipment, as well as for decontamination, labeling, containerizing and disposal procedures.

#### **Information Program**

Completion of safety plans requires identification and assessment of risk from exposure to biological hazards. This program deals primarily with two forms of infection Hepatitis B Virus (HBV) and Human Immunodeficiency Virus (HIV)) which are of concern to workers who can come in contact with bodily fluids associated with blood.

WESTON training programs will provide information on Bloodborne Pathogens and the Occupational Exposure to Bloodborne Pathogens Standard to all field personnel with special emphasis on those employees who may be called upon to perform First Aid.

Information on Hepatitis B Virus (HBV) and Human Immunodeficiency Virus (HIV) and the associated disease (AIDS) is included in **Attachment 1**.

#### **Exposure Control**

The Exposure Control Plan is designed to eliminate or minimize employee exposure to bloodborne pathogens through information and training as well as use of Personal Protective Equipment (PPE), safe handling procedures, decontamination and proper disposal procedures.

## **Exposure Determination**

Good practice as well as the OSHA regulation **requires** that the Bloodborne Pathogen Exposure Control Program identify the WESTON activities which **increase** risk of exposure to Bloodborne Pathogens. These activities include:

## **Designated First Aid Providers**

Employee certified in First Aid and CPR may be at risk from Bloodborne Pathogens if these services are rendered. **Attachment 2** lists task by task identification of risk and recommended protective measures for First Aid providers.

## **Methods of Compliance**

### **Universal Precautions**

When treating a victim for an injury, conducting CPR or handling potentially infectious waste, the use of universal precautions is the recommended approach to infection control. Universal precautions assume all human blood and certain human body fluids are infectious for HIV, HBV and other bloodborne pathogens. Other body substances, including feces, urine, or vomit are not included, unless they contain visible blood. Under circumstances in which differentiation between body fluid types is difficult or impossible, all body fluids shall be considered **potentially infectious materials**.

### **Work Practices**

Work practice controls reduce the likelihood of exposure by altering the manner in which a task is performed.

- All first aid procedures involving blood or other potentially infectious materials shall be performed in such a manner as to minimize splashing, spraying, spattering, and generation of droplets of these substances.
- Mouth suctioning of blood or other infectious materials is prohibited.
- When handling sharps such as needles used for bee stings or diabetes, do not recap, purposely bend, break by hand, remove from disposable syringes, or otherwise manipulate by hand. As soon as possible after use, contaminated sharps are to be placed in puncture proof/leak proof containers until they can be disposed of. Broken glassware which may be contaminated shall not be picked up directly with the hands unless gloves to protect the hands against cuts are used. It is best to use mechanical means, such as a brush and dust pan then place contaminated broken glass in a puncture proof/leak proof container.
- When handling red bag waste, hold the top end of the bag rather than the bottom.
- Containers of potentially infectious waste should be labeled with a biohazard label.
- All PPE should be inspected prior to use. PPE should not be worn if the PPE barrier is compromised.
- Hands and other skin surfaces should be washed immediately and thoroughly if contaminated with blood, other body fluids to which universal precautions apply, or their potentially contaminated

articles. Hands should always be washed after gloves are removed even if the gloves appear intact.

- Where hand washing facilities are not readily accessible, an antiseptic hand cleaner along with clean cloth/paper towels or antiseptic towelets should be used. When antiseptic hand cleaners or towelets are used hands shall be washed with soap and running water as soon as feasible.

## **Engineering controls**

Engineering controls isolate or remove the bloodborne pathogen hazard from the workplace.

- Proper containerizing, labeling and disposal of contaminated items are required for all potentially infectious waste.
- Minimizing needle sticks placing them in a puncture proof container.
- Limit access or close off areas which contain potentially infectious materials.

## **Administrative Controls**

Administrative controls reduce or eliminate bloodborne pathogen hazards from the workplace by program development i.e., Exposure Control Plan, auditing to ensure these programs are in place and providing information and training.

## **Personal Protective Equipment (PPE)**

PPE is specialized clothing or equipment worn by an employee for protection against a hazard. **Attachment 3** provides examples of recommendations for PPE in the pre-hospital setting; the list is not intended to be all-inclusive. Ensure that first aid kits (office and field kits) are supplied with the appropriate contents are checked on a monthly basis and restocked when used.

If the chance of being exposed to blood is high, the care giver should put on protective attire before beginning CPR or First Aid. Protective barriers should be used in accordance with the level of exposure encountered.

Under rare or extra-ordinary circumstances, a responding employee may decide, based on his or her judgment, that use of PPE would prevent delivery of care or pose an increased hazard to safety of the employee or co-worker. When this judgment has been made, an investigation of the event will be initiated and documented in order to determine what changes in procedures or protective equipment is needed.

General work clothes (e.g., coveralls, pants, shirts or blouses) not intended to function as protection against a hazard is not considered to be PPE.

All PPE will be removed prior to leaving a contaminated area and secured properly for decontamination or proper disposal.

## **Resuscitation equipment**

No transmission of HBV or HIV infection during mouth to mouth resuscitation has been documented. However, because of the risk of salivary transmission of other infectious diseases and the theoretical risk of HIV and HBV transmission during artificial ventilation of trauma victims, disposable mouth to mouth resuscitation masks (one way valve type only) should be used. These devices are designed to isolate emergency response personnel from contact with victim's blood and blood-contaminated saliva, respiratory secretions, and vomit. Disposable resuscitation equipment and devices should be disposed of once they have been used.

## **Decontamination**

Decontamination uses physical or chemical means to remove, inactivate, or destroy bloodborne pathogens on a surface or item to the point where they are no longer capable of transmitting infectious particles and the surface or item is rendered safe for handling, use or disposal. All spills of blood and blood-contaminated fluids should be promptly cleaned up. The area should be decontaminated with a commercial disinfectant solution or a 1:100 solution of household bleach. Soiled cleaning equipment should be cleaned and decontaminated with the disinfectant solution.

If a victim's clothes become soiled with blood during First Aid or CPR, the soiled material i.e., clothes, resuscitation equipment or disposable towels should be placed in a red or orange plastic bag. If possible this bag should accompany the victim to the hospital or ambulance. Where on-site emergency care is given and additional medical treatment is not likely, place soiled material in a red or orange plastic bag and then arrange for pick-up by a local medical waste disposal company.

## **Containerizing**

The potentially contaminated materials and sharps container generated from giving First Aid and CPR will be placed in a red or orange containers/bag. When PPE is removed it shall be placed in an appropriate designated area for containerization. If the outside contamination of the primary container occurs, the primary container shall be placed within a second container which prevents leakage during handling processing storage, transport or shipping and is labeled or color coded.

Sharps such as needles used for bee stings or diabetes should be placed in a puncture proof/leak proof color coded or labeled container. If other contents could puncture the primary container, the primary container shall be placed within a secondary container which is puncture resistant. The liquid generated from the decontamination process should be contained in a leak proof container until a local medical waste disposal company can provide information on proper disposal based on local, state and federal regulations.

## **Labeling**

Biohazard warning labels are to be attached to containers of regulated wastes or other containers of potentially infectious materials during storage, transport or shipment. Red or orange bags may be substituted for labeling requirement. Ideally such waste generated during WESTON activity will use one and ideally both methods of identification.

## **Disposal**

If an ambulance is called to transport the victim to the hospital, attempts should be made to leave the potentially contaminated red bag waste with the ambulance service. Similarly, if a person is driven to the



hospital by another employee, attempts should be made to leave the red bag waste with the employee for ultimate disposal at the hospital. Containers must be properly identified prior to transport.

Where on-site emergency care is given and additional medical treatment is not likely, place the red or orange plastic bag in a secure place on-site and call a local medical disposal company.

### **Vaccination and Post-Exposure Evaluation and Follow-up**

#### **Vaccination**

It is not WESTON's intent at this time to offer Hepatitis B Vaccination for First Aid providers.

Hepatitis B vaccines are estimated to be 75% effective when given within 1 week after HBV exposure. The HBIG, a preparation of immune globulin with high levels of antibody to HBV (anti-HBs), provides temporary passive protection following exposure to HBV. Combination treatment with hepatitis B vaccine and HBIG is 85%-95% effective in preventing hepatitis B following a documented exposure (MMWR – CDC June 29, 2001).

Upon suspicion or verification of exposure to blood or infectious materials, Hepatitis Vaccination will be made available to the exposed individual(s) at no cost to the employee. The employee will immediately be referred to WESTON's Occupational Medical consultants for counseling and management.

#### **Incident Reporting**

When an employee gives First Aid or CPR, or is potentially exposed to bloodborne pathogens, a Notification of Incident (NOI) Report must be completed. The report must indicate the potential exposure to bloodborne pathogens.

#### **Post Exposure Management and Testing**

Upon learning of exposure to a source or source individual found to be positive for HBV or HIV, WESTON's Medical Consultant will provide direction on case management. The medical consultant, after discussion of the exposure situation with the medical clinic or hospital where the employee was evaluated and treated for injury, will determine whether the exposed employee should be tested for HBV or HIV prior to the status of the source being known (or in the case where the source is unknown).

HBV and HIV testing of the source individual should be done at the local offices' medical clinic or at the hospital where the victim was treated for injury. Local laws may apply for testing source individuals in situations where consent cannot be obtained because the source refuses testing or can not be identified (i.e., an unconscious patient). If the job location does not allow access to the local offices' medical clinic then a new WESTON Occupational Medical Consultant will be consulted for guidance. The alternate clinic/hospital must offer pretest counseling, post test counseling and referral for treatment.

Consult with WESTON's Medical Consultant to determine if the exposed employee should be given the HBV post-exposure vaccination.

Collection and testing of blood for HBV and HIV serological status shall be performed as soon as feasible on the exposed employee's blood (after consent) where the source is found to be positive for HIV or HBV. Results of the source individuals testing shall be made available to the exposed employee, and the employee shall be informed of applicable laws and regulations concerning disclosure of the identity and infectious status of the source individual. When the source individual is already known to be infected with HBV or HIV, testing of the source individual known HBV or HIV status need not be repeated (MMWR – CDC June 29, 2001).

If the source of the exposure is a needle stick or bloodstained material (i.e., blood stained material contacted an open wound on a field team member) the source should be placed in an appropriate container (i.e., sharps container for needles and red bag for blood tainted material). The container should be given to the WESTON medical clinic for analysis. If the source is found to be HBV or HIV positive, the incident report must be updated to change the status from subjected to confirmed exposure. At this point the incident report will be placed in a limited control access portion of incident filing system to maintain confidentiality.

### **Human Immunodeficiency Virus Post Exposure Management**

For any exposure to a source or source individual who has AIDS, who is found to be positive for HIV infection or who refuses testing, the worker should be counseled regarding the risk of infection and evaluated clinically and serologically for evidence for the HIV infection as soon as possible after the exposure. WESTON's Medical Consultant will provide direction on the case management.

If the source individual was tested and found to be seronegative, follow-up will be determined by WESTON's Medical Consultant.

If the source or source individual cannot be identified, decisions regarding appropriate follow-up should be individualized. Serological testing will be made available to all workers who may be concerned they have been infected with HIV through and Occupational Exposure. (MMWR – CDC June 29, 2001) WESTON's Medical Consultant will provide direction on the case management.

### **Communication of Hazards to Employees**

#### **Training Schedule**

Ensure that employees, who are required to provide First Aid and CPR, are trained in regards to all components of the standard upon employee assignment and at the annual refresher training. All First Aid Providers must be aware of task modifications or procedure changes which might affect occupational exposure.

#### **Training Contents**

A sign-up sheet as shown in Table 5 will contain the following information: attendants' names, signatures, job classifications, instructors name and duration of the class.

Training will contain the following information:

- Where an accessible copy of the regulatory text and the WESTON's Exposure Control Plan can be found.
- An explanation of WESTON's exposure control plan and the means by which employees can obtain a copy of the written plan.
- A general explanation of the epidemiology and symptoms of bloodborne diseases.
- An explanation of the appropriate methods for recognizing tasks and other activities that may involve exposure to blood and other potentially infectious materials.
- An explanation of the use and limitations of methods that will prevent or reduce exposure including appropriate engineering controls, work practices, and PPE.
- Information on the types, proper use, location, removal, handling, decontamination and disposal of PPE.
- An explanation of the basis for selection of PPE.

- An explanation of the procedure to follow if an exposure incident occurs, including the method of reporting the incident and the medical follow-up that will be made available.
- Information on the post-exposure evaluation and follow-up that the employer is required to provide for the employee following an exposure incident.
- An explanation of the signs and labels and/or color coding for disposal of infectious materials.
- An opportunity for interactive questions and answers with the person conducting the training session.

### **Recordkeeping**

When an employee gives First Aid or CPR and in doing so becomes subject to this Plan, they will verbally report the incident according to WESTON's Operating Practices and then as soon as possible complete a WESTON Notification of Incident (NOI) Report. As part of a medical record, the circumstances of exposure will be kept confidential. Relevant information includes the activities in which the worker was engaged at the time of exposure, the extent to which appropriate work practices and PPE were used, and a description of the source of exposure (MMWR – CDC June 29, 2001). When the source is tested for HIV or HBV, the incident report is updated and placed in a confidential file.

### **Dates**

This plan was most recently revised on November 8, 2004

## **ATTACHMENT 1**

### **INFORMATION ON INFECTION AND BLOODBORNE PATHOGENS**

#### **EXPOSURE PREVENTION PLAN - FIRST AID PROVIDERS**

##### **INFECTION**

From a definitive standpoint, infection is a state of condition in which the body or part of the body has been invaded by a pathogenic agent (microorganism or virus) which, under favorable conditions, multiplies and produces effects which are injurious. The principal causes of infections are agents belonging to the following groups: viruses, bacteria, rickettsias, fungi and animal parasites.

Microorganisms may gain entry into tissue through the gastrointestinal tract, as in typhoid fever, through the respiratory tract, as in tuberculosis and common colds, through wounds, as in rabies, through contaminated objects as in tetanus or insect bites (as in malaria and yellow fever).

##### **CHAIN OF INFECTION**

The infectious process can best be compared to a chain with six interrelated links, all of which must be present for an infection to take place.

##### **INFECTIOUS AGENT**

The first of these links is the etiologic agent itself - any bacterium, fungus, virus or other microorganism. Not only must the organism be present, it must also be pathogenic, or capable of causing disease. Fortunately, most microorganisms do not fall into this category, and some are even directly beneficial. For example, *Escherichia coli*, a very common bacterium found in the gut can cause various types of infectious complications in a weakened host. However, this organism is also beneficial through its production of Vitamin K, a necessary component in the blood clotting process.

A factor critical to this link involves a phenomenon known as infective dose. Seldom, if ever, has the transmission of disease resulted from the transfer of a single microorganism. It usually requires thousands-to-millions of such agents before infection can actually take place. The actual number of infectious particles necessary to induce infection varies with the particular pathogen in question. It may only take the ingestion of 1,000 salmonella to produce typhoid fever. Hepatitis B, on the other hand, necessitates an infective dose of approximately 100,000 viral particles.

##### **RESERVOIR**

The second major link involves the presence of a reservoir or source which will allow for microbial survival and, perhaps, even multiplication of a potential pathogen. Common reservoirs would include the multitude of supplies and equipment which are used in patient care. The role played by food and drink, linen and other inanimate objects is of comparatively minor significance when measured against that played by the major reservoir, the human being.

Most infections are caused by the patient's own microbial flora. This is not too surprising given the actual number of microorganisms which can normally be found in and on the human body. Each person carries on their skin approximately 10,000 microorganisms per square inch. Adults average about 20 million microorganisms on their skin alone. In the oral cavity, there are approximately 100 billion microorganisms, and in the lower colon there are an excess of 1 trillion.

## **PORTAL OF EXIT**

The third link is the presence of a source from which the pathogen can emerge, a portal of exit. Obvious portals of exit will include the respiratory tract, vascular system, skin and mucous membranes as well as the gastrointestinal and genitourinary tracts. Each of these portals of exits is peculiar to given diseases. For example, tuberculosis and influenza would involve only the respiratory tract, and typhoid fever the gastrointestinal tract. When considering the transmission of any infectious disease, bear in mind the portal of exit specific to that given pathogenic agent.

## **MODE OF TRANSMISSION**

The fourth link, a mode of transmission, is one over which there is a great deal of control. It is this which is, by far, the easiest to break.

Transmission can occur in one of four ways: contact; airborne; vehicular; and vector modes of spread.

Vector involves the transmission of pathogens via insect, animal or plant vectors.

The transfer of infectious agents through vehicular means (fomites) is not a common event. Nonetheless, it can and does occur. Examples would include food borne outbreaks such as cholera and hepatitis A. The vehicular spread of disease is relatively uncommon in health care settings within the United States.

Another mode of transmission involves the airborne route. Several diseases are spread in this manner, the most notable being tuberculosis. Many of the so called "childhood diseases," measles, mumps, and chicken pox, can be spread this way. Control of the airborne spread of disease usually involves good ventilatory patterns and caution when coming into close proximity with infected individuals.

The major mode of disease transfer involves contact transmission. This takes place either through direct or indirect contact, or through droplet spread involving contact with exhaled respiratory secretions. Direct contact transmission primarily involves person-to-person spread through actual physical contact, such as with the unwashed hands of a patient care provider.

Indirect contact transmission can be the result of patient contact with some contaminated intermediate object such as irrigating solutions or respiratory therapy equipment. Droplet spread can occur as the result of contact with respiratory secretions through such means as sneezing or coughing. These various forms of contact transmission account for numerous types of infectious complications including staphylococcal, streptococcal and herpes infections, scabies and influenza.

## **PORTAL OF ENTRY**

The fifth link in the chain requires a suitable portal of entry. The avenues for gaining entry into the body are, in most instances, identical to the portals of exit. For example, only the respiratory tract would be involved in tuberculosis, blood with hepatitis and HIV, the gastrointestinal tract with salmonella. Body trauma, needle stick and puncture injuries are other potential portals of entry. The vast majority of infectious disease and infectious conditions require very specific portals of entry.

## **SUSCEPTIBILITY**

The last major link involves the necessity for a **susceptible** host, someone who lacks effective resistance to a given pathogenic agent. There is a variety of **host factors** which must be met before infection can occur. Very few organisms can gain entrance through **normal** intact skin. Most require some breach in skin integrity. Other less obvious lines of defense **include** tears, gastric acid and cilia of the nose and **upper** respiratory tract. One's ability to mount a local **inflammatory** response provides yet another non-specific host defense mechanism.

There are, however, several biologic factors which **serve** to decrease, rather than increase, a resistance to infection. Extremes in age, either the very young or the very old, are associated with decreased resistance. Other factors such as major surgery and the **presences** of chronic diseases (diabetes, neoplasia, blood disorders) can alter host resistance. Malnutrition, anemia and chronic alcoholism also have pronounced effects on the ability to combat disease (Johnson and Johnson, 1992).

## **HEPATITIS B VIRUS**

### **DEFINITION**

The term "hepatitis" simply means an inflammation of the liver. This condition can be caused by a wide variety of agents, including medications, alcohol, toxic or poisonous substances and infectious agents such as viruses. Hepatitis B, formerly known as "**serum**" hepatitis, is the only form of viral hepatitis that poses a significant occupational threat in the health care environment.

### **SYMPTOMS**

HBV is a disease that causes liver damage, the severity of which can range from mild or even unapparent to severe or fatal. Of the infected individuals, 6 - 10% will become HBV carriers. Carriers are at risk of developing chronic liver disease, including **active** hepatitis, cirrhosis, and **primary** liver cancer, and are infectious to others (MMWR – CDC June 29, 2001).

### **SOURCES OF INFECTION**

The hepatitis B virus has been isolated from various body fluids including blood, semen, vaginal secretions, breast milk, saliva, and serous fluid. Within the health care setting, however, hepatitis B is thought to be transmitted primarily by percutaneous or permucosal exposure to contaminated blood. Such exposure usually consists of inoculation of contaminated blood through such means as needle sticks or the splashing of blood or blood tinged body fluids into the eyes or mouth.

### **RISK**

There is a direct relationship between the likelihood of occupational hepatitis B infection and the frequency of blood contact. Health care professionals such as surgeons, operating room-staff, pathologists and emergency room personnel exhibit a very high incidence of exposure to this virus. It is the frequency of blood contact which determines the level of risk.

### **PROTECTIVE MEASURES**

Protective measures against hepatitis B infection include good hand washing practices caution and proper technique in the handling of needles, sharp supplies and instruments that may be contaminated. Excellent

protective treatment for or prevention of this disease is afforded by both hepatitis B immune globulin (HBIG) and by hepatitis B vaccine. Either or both of these should be given as soon as possible after any documented exposure to blood (Johnson and Johnson, 1992).

## **HUMAN IMMUNODEFICIENCY VIRUS**

### **DEFINITION**

Human Immunodeficiency Syndrome or AIDS is a severe viral disease only recently introduced into the United States. AIDS severely affects the immune system and is characterized by a multitude of opportunistic infections.

The AIDS virus (HIV or human immunodeficiency virus) is typical of most viruses in that it cannot survive for any appreciable amount of time outside of its human host. Its presence in the general environment is extremely unlikely and would be limited to body secretions, primarily blood and semen. Being an unstable virus, HIV is very susceptible to a large number of common household disinfectants.

### **SYMPTOMS**

The outcome or manifestation of illness varies with individuals infected with the virus.

Some infected persons have no disease symptoms and may not show outward signs of the disease for many years. Some infected persons suffer less severe symptoms than do those with diagnosed cases of AIDS. These lesser symptoms may include loss of appetite, weight loss, fever, night sweats, skin rashes, diarrhea, tiredness, lack of resistance to infection, and swollen lymph nodes.

AIDS is the result of the progressive destruction of a person's immune system, which is the body's defense against disease. This destruction allows diseases that the body can normally fight to threaten the person's health and life. A particularly dangerous type of pneumonia and certain other infections often invade a body weakened by HIV. HIV can also attack the nervous system and cause damage to the brain. This may take years to develop. The symptoms may include memory loss, indifference, and loss of coordination, partial paralysis, or mental disorder (MMWR – CDC June 29, 2001).

### **SOURCES OF INFECTION**

The various modes by which HIV can be transmitted are well defined. Male homosexual and bisexual practices along with intravenous (IV) drug abuse are certainly two major means of transmission.

Although not as efficient a mode of spread, heterosexual transmission does occur, and is increasing in incidence in several countries around the world. Comparatively fewer individuals have contracted AIDS as the result of receiving contaminated blood or blood products. In addition, the advent of laboratory tests to detect infection with HIV has all but eliminated any possibility of this mode of transmission.

AIDS is not hereditary, but it can be congenital. In fact, vertical transmission which involves passage of the virus from an infected woman to her unborn child is the third major means of transmission and accounts for the majority of cases of pediatric AIDS.

## **RISK**

There is a common misconception that health care workers are at high risk for acquiring HIV infection through occupational exposure. In truth, studies confirm the fact that this supposed risk is far less than one percent. Of the thousands of health care workers in the United States and other parts of the world

who have been exposed to HIV through patient contact, very few have developed subsequent infection.

## **PROTECTIVE MEASURES**

AIDS is a concern of immense proportion to the health care community. However, from an occupational health point of view, there is little reason for undue concern regarding this virus. Simple employment of good personal hygiene, common sense and the barrier techniques which are discussed in this plan will serve well to prevent health care workers from contracting HIV infection or any other serious illness in the workplace (Johnson and Johnson, 1992).

## **OTHER BLOODBORNE PATHOGENS**

Although not a complete listing the following indicates several additional infectious diseases which are spread by contact with contaminated blood or body fluids.

### **SYPHILIS**

Syphilis is caused by infection with Treponema pallidum, a spirochete (thin-walled, spiral-shaped bacteria). Syphilis, a sexually transmitted infectious disease, is becoming increasingly prevalent in the United States. The natural history of syphilis is characterized by an incubation period of 10 to 90 days during which the patient is seronegative and asymptomatic. After this incubation period, a primary stage occurs, usually characterized by the appearance of a single lesion, or chancre, and normally accompanied by reactivity in serologic tests. Untreated, the primary lesion heals in weeks. Within weeks to months, a variable systemic illness, the secondary stage, characterized by rash, fever and widespread hematogenous and lymphatic dissemination of spirochetes occurs. All infected persons have reactive serologic tests in this stage. Over two-thirds of patients then go into a latent phase when they are asymptomatic. After a variable period of latency, the rest progress to a tertiary stage with high morbidity and mortality including involvement of skin, bones, central nervous and cardiovascular systems. During the course of untreated syphilis, spirochetes may be intermittently found in the bloodstream. Syphilis can probably be transmitted throughout the course of illness, however, not as readily as during primary and tertiary stages. Although syphilis is mainly transmitted sexually or "in-utero", cases of transmission by needle stick, tattooing, and blood transfusion have been documented.

### **MALARIA**

Malaria is a potentially fatal mosquito-borne parasitic infection of the blood cells characterized by paroxysms (sudden, periodic or reoccurring cases) of fever, chills, and anemia. Although not wide-spread in the United States, cases of mosquito borne infection have been documented. The incubation period for malaria in man is based upon which of the four types of spore-forming protozoa caused the disease; typical however, are ranges from 12 days to over 10 months. Symptoms range from various disorders of the digestive and nervous systems characterized by periodic chills, fever and sweats.



## **ARBOVIRAL INFECTIONS**

Arboviral (arthropod-borne) infections (e.g., yellow fever, equine encephalitis, Colorado tick fever) generally do not lead to high or sustained levels of viremia in humans; therefore, there is little potential for person-to-person transmission of these infections through blood products or needle stick injury. The exception is Colorado tick fever caused by a tick-borne virus which infects red-blood cells. Within 3-14 days following tick exposures, the patient experiences fever, chills, headache, muscle and back aches. Several hundred cases are reported annually and transmission by blood transfusion has been documented.

## ATTACHMENT 2

### TASK BY TASK IDENTIFICATION OF RISK AND PROTECTION

<b>CPR AND FIRST AID</b>			
<b>EMERGENCY SITUATION</b>	<b>SERVICE</b>	<b>POTENTIAL CONTACT</b>	<b>PPE REQUIRED</b>
<b>Victim is lying on the ground</b>	Primary survey of victim and opening victims airway	Skin to skin contact	Gloves
<b>Victims breathing has ceased</b>	Rescue breathing	Skin to skin contact Mouth to mouth contact	Gloves Resuscitation mouthpiece
<b>No pulse</b>	CPR	Skin to skin contact	Gloves Resuscitation mouthpiece
<b>Victim is lying on the ground</b>	Secondary survey of victim	Skin to skin contact	Gloves
<b>Choking without stoppage of breathing</b>	Heimlich maneuver	Skin to skin contact	None required if skin is intact Non-intact skin requires gloves
<b>Heart Attack</b>	Comfort victim	Skin to skin contact	Gloves
<b>Bleeding with spurting blood</b>	External control	Skin to skin contact	Gloves Gown or coveralls Apron Mask Eyewear Boot cover
<b>Minimal bleeding</b>	External control	Skin to skin contact	Gloves
<b>Compound fractures</b>	External control	Skin to skin contact	Gloves
<b>Burns</b>	External control	Skin to skin contact	Gloves
<b>Poisoning</b>	If induced vomiting is needed	Skin to skin contact	Gloves Gown Mask Eyewear Boot cover
<b>Diabetic shock</b>	Giving an injection	Sharps from needle could cause direct injection	Gloves Sharps container
<b>Bites and stings</b>	Giving an injection	Sharps from needle could cause direct injection	Gloves Sharps container
<b>Seizures</b>	External control	Eyes and skin contact	Gloves Gown Mask Eyewear
<b>Stroke</b>	Provide comfort	none	None required

### CPR AND FIRST AID

EMERGENCY SITUATION	SERVICE	POTENTIAL CONTACT	PPE REQUIRED
Heat Stress/Cold Stress	External control	Skin to skin contact	Gloves
Victim has fainted	Raise legs for shock	Skin to skin contact	Gloves

Victim falls down in hazardous atmosphere	Rescue victim from area	Skin to skin contact	Gloves
Soiled clothes handling	Place soiled clothing and materials in red/orange bag	Skin contact with bloodborne pathogens in clothing fabrics	Gloves Gown
Decontamination	Scrub with disinfectant	Skin contact with bloodborne pathogens in clothing fabrics	Gloves Gown
Containerization	Place contaminated clothing into bags	Potential skin contact with residual bloodborne pathogen on bags	Gloves Gown

**ATTACHMENT 3**

**DECLINATION OF VACCINATION**

I understand that due to my occupational exposure to blood or other potentially infectious materials I may be at risk of acquiring hepatitis B virus (HBV) infection. I have been given the opportunity to be vaccinated with hepatitis B vaccine, at no charge to myself. However, I decline hepatitis B vaccination at this time. I understand that by declining this vaccine, I continue to be at risk of acquiring hepatitis B, a serious disease. If in the future I continue to have occupational exposure to blood or other potentially infectious materials and I want to be vaccinated with hepatitis B vaccine, I can receive the vaccination series at no charge to me.

\_\_\_\_\_  
Employee Signature

\_\_\_\_\_  
Date

\_\_\_\_\_  
Employee Name (Print)

\_\_\_\_\_  
Employee Number

\_\_\_\_\_  
Safety Officer Signature

\_\_\_\_\_  
Date

**ATTACHMENT D**  
**HAZARD COMMUNICATION PROGRAM**



## SITE-SPECIFIC HAZARD COMMUNICATION PROGRAM

### Location-Specific Hazard Communication Program/Checklist

To ensure an understanding of and compliance with the Hazard Communication Standard, WESTON will use this checklist/document (or similar document) in conjunction with the WESTON Written Hazard Communication Program as a means of meeting site- or location-specific requirements.

While responsibility for activities within this document reference the WESTON Safety Officer (SO), it is the responsibility of all personnel to effect compliance. Responsibilities under various conditions can be found within the WESTON Written Hazard Communication Program.

To ensure that information about the dangers of all hazardous chemicals used by WESTON are known by all affected employees, the following Hazard Communication Program has been established. All affected personnel will participate in the Hazard Communication Program. This written program, as well as WESTON's Corporate Hazard Communication Program, will be available for review by any employee, employee representative, representative of OSHA, NIOSH, or any affected employer/employee on a multi-employer site.

- ☒ Site or other location name/address: OU1 Ellsworth Industrial Park Site-Study Areas A through K; 2500 Curtiss Street; Curtiss and Glenview Intersection; Shopping Mall Parking Lot 63<sup>rd</sup> Street between Belmont and Woodward; I-355 and 63<sup>rd</sup> Street Intersection; Hanson Road between Lee Street and Springside Avenue; Pershing Road between 59<sup>th</sup> Street and Maple Avenue; Downers Grove, Illinois
- ☒ Site/Project/Location Manager: Joseph M. Ruiz
- ☒ Site/Location Safety Officer: TBD
- ☒ List of chemicals compiled, format: ☒ HASP ☐ Other: \_\_\_\_\_
- ☒ Location of MSDS files: On-site Files
- ☐ Training conducted by: Name: \_\_\_\_\_ Date: \_\_\_\_\_
- ☐ Indicate format of training documentation: ☐ Field Log: ☐ Other: \_\_\_\_\_
- ☐ Client briefing conducted regarding hazard communication: \_\_\_\_\_
- ☒ If multi-employer site (client, subcontractor, agency, etc.), indicate name of affected companies: TBD
- ☒ Other employer(s) notified of chemicals, labeling, and MSDS information: Via HASP Review
- ☐ Has WESTON been notified of other employer's or client's hazard communication program(s), as necessary? ☐ Yes ☐ No

### List of Hazardous Chemicals

A list of known hazardous chemicals used by WESTON personnel must be prepared and attached to this document or placed in a centrally identified location with the MSDSs. Further information on each chemical may be obtained by reviewing the appropriate MSDS. The list will be arranged to enable cross-reference with the MSDS file and the label on the container. The SO or Location Manager is responsible for ensuring the chemical listing remains up-to-date.

### Container Labeling

The WESTON SO will verify that all containers received from the chemical manufacturer, importer, or distributor for use on-site are clearly labeled.

The SO is responsible for ensuring that labels are placed where required and for comparing MSDSs and other information with label information to ensure correctness.

### ***Material Safety Data Sheets (MSDSs)***

The SO is responsible for establishing and monitoring WESTON's MSDS program for the location. The SO will ensure that procedures are developed to obtain the necessary MSDSs and will review incoming MSDSs for new or significant health and safety information. He/she will see that any new information is passed on to the affected employees. If an MSDS is not received at the time of initial shipment, the SO will call the manufacturer and have an MSDS delivered for that product in accordance with the requirements of WESTON's Written Hazard Communication Program.

A log for, and copies of, MSDSs for all hazardous chemicals in use will be kept in the MSDS folder at a location known to all site workers. MSDSs will be readily available to all employees during each work shift. If an MSDS is not available, immediately contact the WESTON SO or the designated alternate. When a revised MSDS is received, the SO will immediately replace the old MSDS.

### ***Employee Training and Information***

The SO is responsible for the WESTON site-specific personnel training program. The SO will ensure that all program elements specified below are supplied to all affected employees.

At the time of initial assignment for employees to the work site, or whenever a new hazard is introduced into the work area, employees will attend a health and safety meeting or briefing that includes the information indicated below.

- Hazardous chemicals present at the work site.
- Physical and health risks of the hazardous chemicals.
- The signs and symptoms of overexposure.
- Procedures to follow if employees are overexposed to hazardous chemicals.
- Location of the MSDS file and Written Hazard Communication Program.
- How to determine the presence or release of hazardous chemicals in the employee's work area.
- How to read labels and review MSDSs to obtain hazard information.
- Steps WESTON has taken to reduce or prevent exposure to hazardous chemicals.
- How to reduce or prevent exposure to hazardous chemicals through the use of controls procedures, work practices, and personal protective equipment.
- Hazardous, nonroutine tasks to be performed (if any).
- Chemicals within unlabeled piping (if any).

### ***Hazardous Nonroutine Tasks***

When employees are required to perform hazardous nonroutine tasks, the affected employee(s) will be given information by the SO about the hazardous chemicals he or she may use during such activity. This information will include specific chemical hazards, protective and safety measures the employee can use, and steps WESTON is using to reduce the hazards. These steps include, but are not limited to, ventilation, respirators, presence of another employee, and emergency procedures.

### ***Chemicals in Unlabeled Pipes***

Work activities may be performed by employees in areas where chemicals are transferred through unlabeled pipes. Prior to starting work in these areas, the employee will contact the SO, at which time information as to the chemical(s) in the pipes, potential hazards of the chemicals or the process involved, and the safety precautions that should be taken will be determined and presented.

### ***Multi-Employer Work Sites***

It is the responsibility of the SO to provide other employers with information about hazardous chemicals imported by WESTON to which their employees may be exposed, along with suggested safety precautions. It is also the responsibility of the SO and the Site Manager to obtain information about hazardous chemicals used by other employers to which WESTON employees may be exposed. WESTON's chemical listing will be made available to other employers, as requested. MSDSs will be available for viewing, as necessary.

The location, format, and/or procedures for accessing MSDS information must be relayed to affected employees.



**ATTACHMENT E**  
**AIR SAMPLING DATA SHEETS**



SITE AIR MONITORING PROGRAM								
Field Data Sheets								
<b>Location:</b> OU1 Ellsworth Industrial Park Site-Study Areas A through K; 2500 Curtiss Street; Curtiss and Glenview Intersection; Shopping Mall Parking Lot 63 <sup>rd</sup> Street between Belmont and Woodward; I-355 and 63 <sup>rd</sup> Street Intersection; Hanson Road between Lee Street and Springside Avenue; Pershing Road between 59 <sup>th</sup> Street and Maple Avenue; Downers Grove, Illinois								
% LEL	% O <sub>2</sub>	PID (units)	FID (units)	Aerosol Monitor (mg/m <sup>3</sup> )	GM: Shield Probe/Thin Window		NaI (uR/hr)	ZnS (cpm)
					mR/hr	cpm		
Monitox (ppm)				Detector Tube(s)				
Sound Levels (dBA)		Illumination	pH	Other	Other	Other	Other	Other
<b>Location:</b>								
% LEL	% O <sub>2</sub>	PID (units)	FID (units)	Aerosol Monitor (mg/m <sup>3</sup> )	GM: Shield Probe/Thin Window		NaI (uR/hr)	ZnS (cpm)
					mR/hr	cpm		
Monitox (ppm)				Detector Tube(s)				
Sound Levels (dBA)		Illumination	pH	Other	Other	Other	Other	Other

## AIR MONITORING/SAMPLING DATA LOG

Client: U.S. EPA

W.O. No.:

20064.251.100.0132

Sample No.:

Address: OU1 Ellsworth Industrial Park Site,  
Downers Grove, Illinois

Sampled By:

Date:

### Employee and Location Information

Employee Name:

Employee No.:

Job Title:

Respirator

- ☐ APR    ☐ ½ Mask    ☐ Full Face  
☐ PAPR    ☐ ½ Mask    ☐ Full Face    ☐ Hood  
☐ SAR    ☐ ½ Mask    ☐ Full Face    ☐ Hood  
☐ SCBA

Manufacturer:

Cartridge Type:

PPE:

- ☐ Hard Hat    ☐ HPD    ☐ Gloves    ☐ Safety Shoes    ☐ Coveralls    ☐ Other:

### Sampling Data

Sampling Type:

☐ Personal

- ☐ TWA    ☐ STEL    ☐ Area    ☐ Source  
☐ Full Shift    ☐ Partial Shift    ☐ Grab

Media:

Pump Type/Serial No.:

Calibrator/Serial No.:

/

Pre-Calibration:

1.  
2.  
3.

avg-pre:

Post-Calibration:

1.  
2.  
3.

avg-post:

Start Time:

Restart Time:

Restart Time:

Avg. Flowrate:

% Change:

1<sup>st</sup> Stop Time:

2<sup>nd</sup> Stop Time:

3<sup>rd</sup> Stop Time:

Total Time:

Volume:

Multiple Samples for this TWA:

- ☐ Yes    ☐ No

Multiple Chemical Exposures:

- ☐ Yes    ☐ No

Exposure Time:

- ☐ Normal    ☐ Worst Case

### Sampling Conditions

Weather Conditions:

Temp:    R.H:    B.P.:    Other:

Engineering Controls:

### Substances Evaluated

Substance	Result	Substance	Result	Substance	Result

### Observations and Comments

QA by:

Date:

**ATTACHMENT F  
INCIDENT REPORTING**

**CLICK HERE FOR LATEST NOI FORM**

**Questions can be directed to:**

Susan Hipp-Ludwick, 610.701.3046

Matt Dillon, 610.701.7413



# NOTIFICATION OF INCIDENT—INITIAL REPORT

The NOI form should be utilized to report all incidents. Incidents include: employee accidents, injuries, auto accidents, property damage/loss, security events, subcontractor injuries/accidents/events, or other liability situations or circumstances that could give rise to a claim. The NOI form is intended to be a preliminary summary (due within 24 hours/one business day) reporting what is immediately known of an event or situation. After a NOI report is released, and the appropriate resources within the organization are notified, an investigation should be initiated.

**INCIDENTS** are to be reported in writing, and sent by email to Susan Hipp-Ludwick and Matt Dillon in the Risk Management Department (RMD) within 24 hours.

For **SAFETY-RELATED INCIDENTS** involving an employee(s) or subcontractor distribution also includes, Owen Douglass of Corporate EH&S, the Direct Supervisor of the involved employee(s), the Safety Officer, the Client Service Manager (CSM), and the Division EH&S Manager.

- Additionally include in distribution: Pat McCann, President; Alan Solow, COO; Ray Griffin, Senior VP of HR; the appropriate Division Manager(s), and involved employee if such person is not the person completing the NOI. Others may be added to the distribution as designated by a division, business team, profit center or project management.

For **SECURITY INCIDENTS**, initial distribution limited to William Irwin, Corporate Security Manager and Susan Hipp-Ludwick, Corporate Risk Manager.

## **SECTION I: INCIDENT SUMMARY**

☐ SECURITY    ☐ INJURY / ILLNESS    ☐ AUTO    ☐ SUBCONTRACTOR    ☐ OTHER  
(e.g., Environmental, Liability, or Property damage)

1. DATE / TIME /LOCATION OF INCIDENT (Project, Office, or Other location. Include WO#):

2. EMPLOYEE(S) / INDIVIDUAL(S) INVOLVED or WITNESS TO INCIDENT / EVENT:

JOB TITLE / ROLE:

DIV./ PROFIT CENTER / ORG. UNIT

3. DIRECT SUPERVISOR / AND OFFICE MANAGER OR PROJECT MANAGER (Whomever is Appropriate):

4. DIVISION / LOCAL SAFETY OFFICER:

5. DESCRIPTION OF INCIDENT / POTENTIAL LIABILITY EXPOSURE/EVENT AND RESULTING INJURY / DAMAGES:

6. WERE AUTHORITIES CONTACTED (police, government)? IF YES, IDENTIFY (i.e., agency name, case number, etc).

## **SECTION II: INJURY/IES**

7. TREATING PHYSICIAN NAME, HOSPITAL, if Applicable:

8. CAN PERSONNEL RETURN TO WORK?

RESTRICTIONS, IF KNOWN :

**SECTION III: IF VEHICLE OR EQUIPMENT INVOLVED**

9. EQUIPMENT / VEHICLE INFORMATION (Year / Make / Model): VIN:

OWNED ☐ RENTED ☐ ALLOWANCE ☐ PERSONALLY OWNED VEHICLE ☐

FOR ADDITIONAL INFORMATION, CONTACT (Name and Phone Number):

***This is preliminary information, subject to change, and may contain errors. Any errors in this report will be corrected as follow-up investigation is conducted.***

Questions can be directed to Susan Hipp-Ludwick at 610.701.3046



**ATTACHMENT G**  
**AHA CHECKLIST AND ENV. COMPLIANCE**

I:\WOIRAC\251\36563HASP.DOC

RFW251-2D-AWBH



**HAZARD CHECKLIST** Site Manager/EHS Officer:

Task Team (name or reference via daily sign-in sheet)

Date:

Location: Ellsworth Industrial Park Site

Address: OU1 Ellsworth Industrial Park Site-Study Areas A through K; 2500 Curtiss Street; Curtiss and Glenview

Intersection: Shopping Mall Parking Lot 63<sup>rd</sup> Street between Belmont and Woodward; I-355 and 63<sup>rd</sup> Street Intersection;Hanson Road between Lee Street and Springside Avenue; Pershing Road between 59<sup>th</sup> Street and Maple Avenue; Downers

Grove, Illinois

**HAZARDS IDENTIFIED (check those applicable)**

	Chemical	Biological	Physical	Aerial lifts	Remote Areas
<input type="checkbox"/>	Flammable/combustible	<input type="checkbox"/> Insects	<input type="checkbox"/> Noise	<input type="checkbox"/> Man. Material Handling	<input type="checkbox"/> Materials handling
<input type="checkbox"/>	Corrosive	<input type="checkbox"/> Animals	<input type="checkbox"/> Heat	<input type="checkbox"/> Demolition	<input type="checkbox"/> High Pressure Washers
<input type="checkbox"/>	Oxidizer	<input type="checkbox"/> Plants	<input type="checkbox"/> Cold	<input type="checkbox"/> Excavation	<input type="checkbox"/> Hand and Power Tools
<input type="checkbox"/>	Reactive	<input type="checkbox"/> Mold/Fungus	<input type="checkbox"/> Inclement Weather	<input type="checkbox"/> Pile Driving	<input type="checkbox"/> Low Illumination
<input type="checkbox"/>	Toxic	<input type="checkbox"/> Viral/Bacterial	<input type="checkbox"/> Hot Work	<input type="checkbox"/> Welding/Cutting/Burn	<input type="checkbox"/> Drilling & Boring
<input type="checkbox"/>	Inhalation	<input type="checkbox"/> Density Gauges	<input type="checkbox"/> Confined Spaces	<input type="checkbox"/> Hot Surfaces	<input type="checkbox"/> Striking against/Struck-by
<input type="checkbox"/>	Eyes/Skin	<input type="checkbox"/> Radiological	<input type="checkbox"/> Stored hazardous Energy	<input type="checkbox"/> Hot Materials	<input type="checkbox"/> Caught-in/Caught between
<input type="checkbox"/>	Pesticides	<input type="checkbox"/> Ultra-Violet	<input type="checkbox"/> Elevation	<input type="checkbox"/> Rough Terrain	<input type="checkbox"/> Pushing/pulling
<input type="checkbox"/>	Carcinogen	<input type="checkbox"/> Sunlight	<input type="checkbox"/> Utilities	<input type="checkbox"/> Compressed Gases	<input type="checkbox"/> Falls at same level
<input type="checkbox"/>	Asbestos	<input type="checkbox"/> Infrared	<input type="checkbox"/> Machinery	<input type="checkbox"/> Hazardous Mat. Storage	<input type="checkbox"/> Falls from elevation
<input type="checkbox"/>	Lead	<input type="checkbox"/> Lasers	<input type="checkbox"/> Mobile equipment	<input type="checkbox"/> Diving	<input type="checkbox"/> Repetitive motion
<input type="checkbox"/>	UXO/OE/CWM	<input type="checkbox"/> XRF	<input type="checkbox"/> Cranes	<input type="checkbox"/> Operation of Boats	<input type="checkbox"/> High (>110v) Electricity
<input type="checkbox"/>	Process Safety	<input type="checkbox"/> Isotopes	<input type="checkbox"/> Manual Material Handling	<input type="checkbox"/> Working Over Water	<input type="checkbox"/> Slippery surface Ice/Snow
<input type="checkbox"/>	Applying Paint/Coatings	<input type="checkbox"/>	<input type="checkbox"/> Ladders	<input type="checkbox"/> Traffic	<input type="checkbox"/>
<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/> Scaffolding	<input type="checkbox"/> Site Security	<input type="checkbox"/>

**REQUIRED PROTECTION (check those applicable)**

Engineering Controls		Administrative Control	PPE			Contingency
<input type="checkbox"/>	Guard Rails	<input type="checkbox"/> Qualified for task	<input type="checkbox"/> Air Supplying Respirator	<input type="checkbox"/> Tyvek coveralls	<input type="checkbox"/> Emergency Signal Known	
<input type="checkbox"/>	Machine Guards	<input type="checkbox"/> Trained/Certified	<input type="checkbox"/> Air Purifying Respirator	<input type="checkbox"/> Coated Coveralls	<input type="checkbox"/> Eye wash/shower Location	
<input type="checkbox"/>	Sound Barriers	<input type="checkbox"/> Hot Work Permit	<input type="checkbox"/> SCBA	<input type="checkbox"/> Welding leathers	<input type="checkbox"/> First Aid Kit Location	
<input type="checkbox"/>	Enclosure	<input type="checkbox"/> CSE Permit	<input type="checkbox"/> Hard Hat	<input type="checkbox"/> CWM	<input type="checkbox"/> Fire Extinguisher Location	
<input type="checkbox"/>	Elevation	<input type="checkbox"/> Lockout/Tag Out	<input type="checkbox"/> Ear Plugs	<input type="checkbox"/> Safety Shoes/Boots	<input type="checkbox"/> Spill Kit Location	
<input type="checkbox"/>	Isolation	<input type="checkbox"/> Work Permit	<input type="checkbox"/> Ear Muffs	<input type="checkbox"/> Rubber Boots	<input type="checkbox"/> Severe weather shelter	
<input type="checkbox"/>	GFCI	<input type="checkbox"/> Dig Safe Permit	<input type="checkbox"/> Safety Glasses	<input type="checkbox"/> Gloves	<input type="checkbox"/> Evacuation Routes	
<input type="checkbox"/>	Assured Ground Program	<input type="checkbox"/> Contingency Plan	<input type="checkbox"/> Goggles	<input type="checkbox"/> Cooling Suits		
<input type="checkbox"/>	Apply Anti-slip/skid Mat	<input type="checkbox"/> Critical Lift Plans	<input type="checkbox"/> Chemical Goggles	<input type="checkbox"/> Ice Vests		
		<input type="checkbox"/> Equip. Inspection Sheets	<input type="checkbox"/> Face Shield	<input type="checkbox"/> Radiant heat Suits		
			<input type="checkbox"/> Thermal Shield	<input type="checkbox"/> Fall Arrest		
			<input type="checkbox"/> Welding Mask	<input type="checkbox"/> PFD		
			<input type="checkbox"/> Cutting Glasses	<input type="checkbox"/> Electrical insulation		
Any Modification to Tasks (list)		Other tasks or activities that may affect my activity			Reasons for any changes indicated above	

## Environmental Compliance Considerations:

<input type="checkbox"/>	Generation of Hazardous Waste*	<input type="checkbox"/>	→Waste Identification & Manifesting - Marking, Placarding, Labeling
<input type="checkbox"/>	Generation of Investigation Derived Waste*	<input type="checkbox"/>	→Training & Licensing for Use of Radioactive Materials/Sources
<input type="checkbox"/>	Treatment, Storage, or Disposal of Hazardous Waste*	<input type="checkbox"/>	→ Containers: dated, labeled, closed, full, stored less than 90 days
<input type="checkbox"/>	Contingency to prevent or contain hazardous materials or oil spills or discharges to drains, body of water, soil*	<input type="checkbox"/>	→ Risk of explosion or catastrophic release due to chemical storage or processing involving reactivity, flammables, solvents or explosives
<input type="checkbox"/>	Disturbing of Asbestos Containing Materials (ACM)*	<input type="checkbox"/>	→ Training & Licensing for Asbestos Remediation Activities
<input type="checkbox"/>	Application of Pesticides or Herbicides*	<input type="checkbox"/>	
<input type="checkbox"/>	Work on Above or Under-ground Storage Tanks*	<input type="checkbox"/>	
<input type="checkbox"/>	Transportation, Storage or Disposal of Radioactive Material*	<input type="checkbox"/>	
<input type="checkbox"/>	Activities producing or generating Air Emissions (or fugitive "fence-line" emissions) requiring either monitoring and/or permit*	<input type="checkbox"/>	
<input type="checkbox"/>	Excavations, Drilling, Probing or other activities that could impact underground utilities, pipelines, sewer or treatment systems.	<input type="checkbox"/>	
<input type="checkbox"/>	Shipment of Hazardous Waste off-site*	<input type="checkbox"/>	
<input type="checkbox"/>	Shipment of Samples in accordance with DOT/IATA	<input type="checkbox"/>	

\* Indicates need for an environmental compliance plan.

# ENVIRONMENTAL HEALTH AND SAFETY REGULATORY IMPACT CHECKLIST

## PRE-PROPOSAL and EHS COMPLIANCE PLANNING

### 1. BACKGROUND

- a. Client name, address, phone number, and Point of Contact:

U.S. Environmental Protection Agency  
77 West Jackson Boulevard  
Chicago, IL 60604-3590

Mr. Mazin Enwiya

- b. Name/Identifier of proposal, if applicable:

OU1 Ellsworth Industrial Park Site, Downers Grove, IL

- c. Prepared by: Trenna Sundquist

### 2. DESCRIPTION

- a. Description, justification for, and location of SOW in the proposal (i.e. training, activity, construction, regulation, license; include site location map):

See Scope of Work

- b. Environmental setting and present land use of the proposed site:

The Ellsworth Industrial Park (Ellsworth) Site is located in Downers Grove, DuPage County, Illinois. The approximate boundaries of the overall site are Burlington Avenue to the north, 63<sup>rd</sup> Street to the south, Lee and Springside Avenues to the east, and Interstate 355 (I-355) to the west. The overall site has been further subdivided by the U.S. EPA into Operable Unit 1 (OU1) and Operable Unit (OU2). This HASP is specific to OU1, which consists of the industrial park proper. OU2 consists of the groundwater contamination areas detected in the residential areas outside (south and west) of the Ellsworth Industrial Park. OU1 consists primarily of commercial/light industrial properties, and OU2 consists primarily of residential, recreational, and commercial properties. OU1 is bordered on the north by Burlington Avenue; on the south by Elmore and Inverness Avenues; on the east by Belmont Avenue; and on the west by I-355.

The Ellsworth Industrial Park was built in the late 1950's and currently consists of approximately 135 businesses. Surrounding properties encompass residential, recreational, and commercial/light industrial properties. The businesses that currently occupy the industrial park and the surrounding areas perform a broad range of activities.

A number of past investigations have been conducted at and surrounding the Ellsworth Industrial Park by Federal, State, Municipal, and private property owners.

### **Initial Residential Well Sampling**

Between Spring and Fall 2001, the IEPA performed residential water well sampling on the east side of I-355 near Downers Grove in response to citizen concerns related to private-well sampling in neighboring Lisle. The investigation consisted of three rounds of residential-well sampling throughout the area. Approximately 495 private wells were sampled and analyzed for levels of VOCs. Sample results indicated elevated levels of perchloroethylene (PCE), trichloroethylene (TCE), and other related VOCs. Approximately 52% of the samples collected during Round 1 and Round 2 contained PCE or TCE above 5 micrograms per liter ( $\mu\text{g/L}$ ) or parts per billion (ppb) (the federal drinking-water standard and the State of Illinois Maximum Contamination Limit [MCL]). The results of this investigation identified a chlorinated solvent plume within the bedrock aquifer.

### **Subsurface Groundwater Investigation**

In response to initial residential-well water sampling, IEPA performed a cone penetration test (CPT) investigation within the Ellsworth Industrial Park. The results of this investigation are contained in the *Subsurface Groundwater Investigation Report, Ellsworth Industrial Park* (Parsons, 2001). The investigation used a CPT rig to log the overburden lithology in the area and collect groundwater samples at a variety of depths above the bedrock in order to evaluate potential source area(s) of chlorinated solvent releases. The area of investigation included only the southern and southeastern-most portions of the industrial park along portions of Wisconsin, Elmore, and Inverness Avenues. Groundwater samples were collected using the CPT sampler and by the installation of temporary 3/4-inch polyvinyl chloride (PVC) piezometers. During the investigation, 28 groundwater samples were collected from 27 separate sampling locations within the industrial park. Of the 28 groundwater samples, one sample was found to contain TCE above the method detection limit.

### **Phase I Site Assessment**

In February 2002, the U.S. EPA and the IEPA conducted additional joint-effort groundwater investigations within and outside the industrial park to further evaluate the presence of chlorinated solvent groundwater contamination and narrow down potential source areas. The results of this investigation were documented in the *Final Preliminary Groundwater Investigation Report* (Weston, 2002), and has been heretofore referred to as the Phase I Site Assessment (SA). During this study, the IEPA conducted boring and sampling activities using a Geoprobe unit outfitted with a membrane interface probe (MIP) for soil logging and sample collection. The U.S. EPA performed a follow-up CPT investigation throughout the industrial park and selected areas east of the park. The CPT rig was used to advance stratigraphy borings, which aided in evaluating the geology at each location, as well as identified the presence of water-bearing zones within the unconsolidated overburden soil. Each boring was advanced to refusal, which ranged from approximately 12 to 80 feet below ground surface (bgs). A total of 44 locations were advanced using the CPT and Geoprobe MIP technology. Once the stratigraphy was characterized and the water-bearing zones were identified, depth intervals were selected for groundwater sampling. A total of 37 investigative groundwater samples were collected. Chlorinated constituents, including 1,1,1-trichloroethane (TCA), tetrachloroethylene (PCE), trichloroethylene (TCE), and their common degradation products, were detected at several locations and at various concentrations within the industrial park. The highest concentrations were generally found to be present along Curtiss Street between Chase Street and Katrine Avenue. The presence of TCE and PCE in shallow groundwater provided a potential link between source(s) in the industrial park and contamination observed in residential wells downgradient of the Site.

### **Phase II Site Assessment**

Based on the results of the previous groundwater investigations, a Phase II SA was undertaken as a joint effort between the U.S. EPA and the IEPA to further characterize chlorinated solvent contamination in soil and groundwater and identify potential source properties. The results of this investigation were documented in the *Phase II Site Assessment Report* (Weston, 2002). Prior to field investigation activities, efforts were undertaken to gather and evaluate existing data and information on properties and businesses within the industrial park. This information was used to focus field investigative efforts on potential chlorinated solvent source areas based on past and present use of these chemicals. In addition to focused investigations at specific facilities, a network of groundwater monitoring wells was also installed throughout the industrial park to begin evaluating site hydrogeologic characteristics. During the investigation, 21 soil borings were advanced, along with the installation of 25 overburden and 17 bedrock monitoring wells.

The results of the Phase II SA indicated that PCE and TCE, and their degradation products, were present at numerous and widespread locations and depths within the Ellsworth Industrial Park in soil at concentrations up to

500,000 micrograms per kilogram (ug/kg). PCE and TCE were also detected in groundwater in both glacial drift and bedrock aquifers at concentrations up to 190 ug/L. By comparison, the highest PCE/TCE concentrations observed in residential wells south of the Site were typically around 15 ug/L. The compound 1,1,1-TCA was also found at significant concentrations. The data indicated that chlorinated solvent constituents appear likely to be migrating from sources within the industrial park through overburden soil, entering the bedrock aquifer system, and migrating in a downgradient direction towards the affected residences.

#### **Supplemental Investigation**

A Supplemental Investigation was undertaken by the U.S. EPA to further investigate 27 additional properties within and outside of Ellsworth Industrial Park boundaries to identify properties that may have contributed to the groundwater contamination detected in the industrial park and residential areas south of the industrial park. The results of this investigation were documented in the *Data Evaluation Summary Report* (Weston, 2004). The scope of work included borehole logging and soil and groundwater sampling. Work was performed at targeted businesses or sites selected by the U.S. EPA based on historical data and information. During the investigation, a total of 118 soil borings were advanced, and 67 groundwater samples were collected. PCE, TCE, and their common breakdown products were detected in shallow soil during this investigation at concentrations up to 35,000 ug/kg, and in shallow groundwater at up to 340 ug/L.

#### **Records Review Activities**

Throughout the Ellsworth Industrial Park investigation process, the U.S. EPA and the IEPA have evaluated available documents and records from numerous properties and businesses within and around the industrial park to identify current and previous users of chlorinated-solvent products. In October 2001, the IEPA sent out information-request letters to approximately 21 facilities that had been identified during their initial door-to-door survey of the Ellsworth Industrial Park as using chlorinated cleaners/solvents or other types of chlorinated materials. The information IEPA requested pertained to the Site activities related to the purchasing, receiving, processing, storing, treating, disposing, or otherwise handling of hazardous substances. The U.S. EPA issued supplemental information requests and reviewed this information supplied to the U.S. EPA and the IEPA, along with available records from the U.S. EPA Records Center in order to develop a list of facilities in the industrial park identified as using chlorinated solvents. The U.S. EPA has, and will continue the process of gathering and evaluating background data and information into the RI/FS stage.

#### **Investigations Conducted by Others**

Several additional investigations have been conducted by others either as part of investigations related to the Ellsworth Industrial Park groundwater contamination issues, or investigations conducted by individual property owners within Ellsworth Industrial Park as part of due diligence activities. Investigations for which subsurface testing activities took place and records were available are summarized in the following subsections.

#### **Wastewater Treatment Plant Sewage Lagoon Area Studies**

An investigation was conducted at the Downers Grove Sanitary District's (DGSD) Sewage Lagoon Area in the Fall of 2002 (Huff & Huff, Inc., 2002). This investigation consisted of two soil borings advanced through the existing sludge in the DGSD west and east lagoons; and the installation of five additional monitoring wells on their property adjacent to the lagoons. Sludge/soil samples were collected and analyzed from each of the two soil borings and groundwater samples were collected from the five newly installed wells and three existing monitoring wells. The sludge/soil and groundwater samples were analyzed for VOCs. VOCs were not detected in lagoon sludge/soil samples. VOCs were detected in groundwater confirming the presence of TCE up to 9 ug/L in U.S. EPA monitoring well BD(4I) on the DGSD property. Additional VOCs including 1,1,1-TCA, 1,1-DCA, chloroethane, and vinyl chloride were detected in two of the newly installed monitoring wells. Based on groundwater flow directions presented, this report concluded that the presence of VOCs in groundwater was due to an off-site source.

#### **Chase-Belmont Properties Subsurface Soil Investigation**

An investigation was conducted in January 2003 on the five buildings addressed as 5000-5111 Chase Avenue, Downers Grove, Illinois (EarthTech, 2003). A total of 16 geoprobe soil borings were advanced during this investigation at depths ranging from 16 to 20 ft bgs. Sixteen soil samples and four water samples were collected during this investigation at various locations around the buildings and analyzed for VOCs. PCE was detected in shallow soil at concentrations up to 165 ug/Kg. PCE and TCE were detected in shallow groundwater samples at concentrations up to 23 ug/L and 10 ug/L, respectively.

#### U.S. EPA Hydrogeologic Investigations 2003 and 2004

The U.S. EPA conducted additional hydrogeologic characterization in 2003 and 2004 in the vicinity of the Ellsworth Industrial park. Activities were conducted in what is currently designated OU1, as well as in OU2. Investigation activities consisted of geophysical logging in select residential water supply wells, and water level monitoring throughout the OU1 and OU2 areas. These investigations concluded that wells open to the drift aquifer indicate downward vertical groundwater flow but no consistent horizontal groundwater flow direction. Groundwater flow directions in the bedrock aquifer are predominantly from northwest to southeast and do not appear to have been altered by the cessation of pumping from residential water wells as they were abandoned or decommissioned due to municipal water supply hookup. Geophysical logging indicated that fractures in the dolomite bedrock tend to be concentrated at certain elevations, but elevation patterns were not evident.

#### Due Diligence and Hydrogeologic Investigations - 2537 Curtiss Street Property

A number of investigations have been conducted at the 2537 Curtiss Street property beginning with a Phase I Environmental Site Assessment (ESA) in November 2000 (Environmental Group Services, Ltd., 2000). The Phase I ESA indicated that chlorinated solvents had been used at the facility and staining and solvent odors were present within expansion joints of the concrete foundation. Based on these results, a Phase II investigation was conducted (Environmental Group Services, Ltd., July 2001). During this investigation, three soil borings were advanced below the concrete foundation within the building. Soil samples were collected and analyzed for VOCs and only minor compound detections were observed. An expanded Phase II investigation was also conducted (Environmental Group Services, Ltd., September 2001) in which additional borings were advanced within the building foundation footprint. PCE was detected in two soil samples ranging from 14 to 33 ug/kg. 1,1,1-TCA was also detected. Based on these results, two additional investigations were carried out to investigate the hydrogeologic characteristics of the Site and determine whether chlorinated solvents were present in shallow groundwater. The results of these investigations were summarized in two reports (Environmental Group Services, Ltd., December 2001, and January 2002). Ten shallow monitoring wells were installed on-site, and soil and groundwater samples were collected. These hydrogeologic investigations concluded that the shallow subsurface geology is variable and consists primarily of tills interbedded with saturated silt, sand, and gravel layers. Shallow groundwater is contained within these seams and layers at depths between 13 and 30 feet bgs; however, several wells were also observed to be dry, indicating a perched groundwater system was likely present at shallow depths. PCE, TCE, and 1,1,1-TCA were detected in subsurface soil at concentrations up to 119 ug/kg, 6.6 ug/kg, and 61.6 ug/kg, respectively. PCE and TCE were also found to be present in groundwater samples from the shallow monitoring wells at concentrations up to 140 ug/L and 8.5 ug/L, respectively. PCE/TCE daughter products were also observed at low levels.

#### Focused Site Investigation - 2659 Wisconsin Avenue Property

Focused Site characterization activities were conducted as part of a remedial action conducted at the 2659 Wisconsin Avenue property (Pioneer Environmental, Inc, 2000 and 2001). Background information indicates chlorinated solvents were used at this facility and a release was documented through a floor drain which impacted soil in a small area on the east side of the building. PCE, TCE, and their daughter products were detected in subsurface soil in this area based on soil boring and sample collection. These reports indicate that the nature and extent of chlorinated solvent contamination was delineated and performed subsequent risk analyses in accordance with the IEPA regulations. Groundwater was not encountered during the focused investigations.

#### Phase II Site Investigations - 2525 Curtiss Street Property

A Phase I ESA was conducted at the 2525 Curtiss Street property in July 2000 (Caddis, Inc., July 2000). The Phase I ESA indicated that various hazardous substances, including chlorinated solvents, were handled at the facility, and recommended subsequent sampling take place. Based on this recommendation, a Phase II Site Investigation was conducted (Caddis, Inc., August 2000). Information contained in this report indicated a 2,000 gallon waste solvent UST was removed from the Site in 1988. Ten soil borings were conducted at locations around the facility. PCE was detected from all soil samples collected exterior to the south side of the building at concentrations up to 238 ug/kg. Metals and PCBs were not detected above background levels and PCBs were not detected above laboratory detection limits. A Supplemental Phase II Investigation was conducted the following year (Caddis, Inc., October 2001). Eleven additional soil borings were advanced on the south, east, and west sides of the property. PCE was detected in four of the 11 soil borings at concentrations ranging from 71.3 ug/kg to 350 ug/kg. TCE was also detected at 41.2 ug/kg. DCE and 1,1,1-TCA were also detected in soil during this investigation.



#### UST Corrective Action Completion Report - 5225 Walnut Avenue Property

A UST Corrective Action Completion report was prepared for the 5225 Walnut property and submitted to the IEPA (United Environmental Consultants, Inc., September 1999). A 2,500 gallon mineral spirits UST was removed from this property under OSFM Tank Removal Permit #00462-1999. The OSFM representative concluded upon removal that a release had occurred due to strong odors associated with the excavation and an observed sheen on water within the excavation cavity. The release was classified as a "minor" release. Incident No. 991205 was assigned to the release. Approximately 1,750 gallons of liquids were removed using vacuum equipment and approximately 195 cubic yards of soil and backfill were excavated and removed. UST excavation closure soil sampling took place in accordance with IEPA protocol and no constituents were detected above 35 Illinois Administrative Code (IAC) Part 742 Tier I soil cleanup objectives. Although specific correspondence is not available, Site personnel indicated that subsequent to the UST removal, three shallow groundwater monitoring wells were installed on the property to evaluate whether the UST had impacted shallow groundwater. No early results of sampling of these wells were received; however, these wells were sampled during the U.S. EPA Phase II SA in 2002 and VOCs were not detected.

### **3. KNOWN OR POTENTIAL EHS IMPACTS:**

*Note that this checklist cannot completely anticipate all regulatory requirements, and that use of this checklist outlines only certain Federal criteria of specific interest (it is by no means a complete listing). State and local requirements must be evaluated also. The project team is responsible for evaluating project-specific environmental, health and safety needs that may be beyond those outlined in this checklist.*

#### **3.1 Clean Air Act**

*The basic purpose of the Act is to control air pollution by instituting point source controls (fixed and/or mobile) and establishing maximum pollutant levels for the ambient air. Permits to construct and/or operate are required for sources that meet regulatory requirements. These sources include, but may not be limited to: major stationary sources, hazardous air pollution sources, and sources subject to new source performance standards.*

##### **General and Miscellaneous:**

Yes	No	Unknown	Will the project release contaminants to the air from a new or existing source of air contaminants?
Yes	No	Unknown	Does the project have the potential for deterioration of air quality?
Yes	No	Unknown	Will there be the introduction of smoke, suspended particles, or noxious gases/vapors (e.g., open burning, open detonation, etc.)?
Yes	No	Unknown	Will there be real or potential for particulate/dust migration beyond facility/site boundaries?
Yes	No	Unknown	Will WESTON own or operate a source of air emissions (e.g., air stripper, incinerator, thermal desorption system, soil vapor extraction system, fuel tanks or dispensers, electric generators, turbines, or disturb land?

Yes	No	Unknown	Will WESTON own or operate an air pollution control device (e.g., scrubber, vapor-phase activated carbon system)?
Yes	No	Unknown	Is fugitive emissions and/or perimeter air monitoring specified in the scope of work?
Yes	No	Unknown	Has client specified air monitoring methods or real-time monitoring?

**Prevention of Significant Deterioration (PSD) Permits (40 CFR 52)**

Yes	No	Unknown	Is site within an attainment area? (See 40 CFR 81.301-356).
Yes	No	Unknown	Will the project involve construction or operation of a new major source with the potential to emit more than 100 tons/year for those specific listed emissions sources or 250 tons/year for all other emission sources types or a major modification of an existing major source with pollutant emission increases exceeding Prevention of Significant Deterioration (PSD) rates? (see 40 CFR 52.21(b) and/or CAA Section 169).

**Non-Attainment Permits (40 CFR 52)**

Yes	No	Unknown	Is site within a non-attainment area? (See 40 CFR 81.301-356). If known, indicate which criteria pollutant(s) are not met.
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**New Source Performance Standards (40 CFR 60)**

Yes	No	Unknown	Will the project involve the release of contaminants to the air from a new or modified non-exempt source?
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**NESHAPS Standards for Air Toxics (40 CFR 61, 63) See also TSCA and OSHA**

Yes	No	Unknown	Will the project involve the demolition or renovation of any structure containing asbestos?
Yes	No	Unknown	Will the project involve a stationary source or group of stationary sources with the potential to emit 10 or more tons/year of a single HAP, or 25 tpy or more of multiple HAPs?

**Accidental Release and Risk Management Planning (40 CFR 68)**

Yes	No	Unknown	Will the project involve storage and/or use of any chemical listed under 40 CFR 68.115 at or greater than its Threshold Planning Quantity (TPQ)?
-----	----	---------	--

**Operating Permits (40 CFR 70, 71)**

Yes	No	Unknown	Will the project involve obtaining any permit as required under the CAA?
-----	----	---------	--

**Reduction in Use of Ozone Depleting Substances (40 CFR 82)**

Yes	No	Unknown	Will site tasks involve repair, maintenance or decommissioning of objects containing ozone depleting substances (e.g., air conditioning/heat pump/refrigeration systems)?
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**State-Specific Requirements**

*As with many environmental regulations, States may have specific and/or additional regulations and laws associated with air and air quality. Remember to evaluate State and/or Local requirements.*

**3.2 Clean Water Act**

*The stated objective of the Act is to restore and maintain the chemical, physical, and biological integrity of the Nation's water by regulating discharges of pollutants into water bodies. Major requirements to plan for include; point source discharges, stormwater discharges, pretreatment prior to sewer system discharge, spill prevention and response, and wetland modification and/or dredge and fill activities.*

**General and Miscellaneous:**

Yes	No	Unknown	Will the project location involve fresh water, marine environment, ground water impact or other?
Yes	No	Unknown	Will the project involve impact to water movement (e.g., construction of dam)?
Yes	No	Unknown	Will the project involve any change in the quantity and/or quality of ground water?
Yes	No	Unknown	Is there any potential for spills of hazardous materials/substances/wastes that could subsequently impact water quality (surface or ground)?
Yes	No	Unknown	Will the project involve any impact to wetlands or floodplains?
Yes	No	Unknown	Is the project in a well head protection area?
Yes	No	Unknown	Will there be any injection of waste materials into the ground?
Yes	No	Unknown	Will unimproved roads or new haul roads be required?
Yes	No	Unknown	Will the project involve the disruption, displacement or compaction of soil?

Yes	No	Unknown	Will the project involve a change in topography at the site?
Yes	No	Unknown	Will the project create an increase in wind or water erosion of soils (either on or off-site)?

**NPDES Point Source Discharge Permit (40 CFR 122)**

Yes	No	Unknown	Will the project involve a point source discharge into surface water?
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**Stormwater Discharge Permit (40 CFR 122.26)**

Yes	No	Unknown	Will the project involve an industrial facility with potential for stormwater discharges to surface water or to a storm sewer system?
Yes	No	Unknown	Will the project involve the disturbance of one or more acres of land?

**Pretreatment Requirements (40 CFR 403)**

Yes	No	Unknown	Will there be a discharge (e.g., process water, groundwater, cooling water) to a sewer authority or public sewer system? (Do not include proper connections from domestic-type sources such as toilets or kitchens).
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**Discharge of Oil and SPCC Plans (40 CFR 110, 112)**

Yes	No	Unknown	Will oil or petroleum products be stored at the site/operation?
Yes	No	Unknown	Will the storage capacity of oil or petroleum products exceed 1320 gallons in above ground storage (include only containers equal to or larger than 55 gallons), or 42000 gallons underground?

**Wetlands Modification and/or Dredge and Fill Requirements (40 CFR 230-233)**

Yes	No	Unknown	Will the project involve excavation in or the discharge or dredge or fill material into water or wetlands?
Yes	No	Unknown	Will the project involve site clearing, or dredging or filling on/near water or wetlands?

**State Requirements**

*As with many environmental regulations, States have specific regulations and laws associated with water protection and quality. Remember to evaluate State and/or Local requirements.*

### 3.3 Safe Drinking Water Act

*The SDWA regulates the quality of drinking water. Requirements typically relate to providing public drinking water, waste disposal in underground injection wells and establishing criteria for CERCLA remediation.*

#### Public Water Supplies and Drinking Water Standards (40 CFR 141-143)

Yes	No	Unknown	Will WESTON be providing a drinking water supply to the public?
Yes	No	Unknown	Will the project involve operating a public water supply system that has 15 or more services or serves more than 25 people per day for more than 60 days per year?

#### Sole-Source Aquifer Protection (40 CFR 149)

Yes	No	Unknown	Will the project involve the discharge of contaminants onto or into areas classified as a sole-source aquifer?
Yes	No	Unknown	Will the project involve activities that could potentially and adversely impact a sole-source aquifer (e.g., roadway construction, stormwater disposal from construction activity)?

#### Underground Well Injection (40 CFR 144-148)

Yes	No	Unknown	Will the project involve the placing of fluids into a bored, drilled, driven or dug well?
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#### State Requirements

*In addition to compliance (and/or more restrictive) with above Federal criteria, States are responsible for implementing and enforcing well-head protection standards.*

### 3.4 Resource Conservation and Recovery Act

*RCRA provides the classic "cradle-to-grave" concept for waste materials, i.e., management of the waste material from generation to final disposal. The coverage for RCRA includes those that generate, transport, store and dispose of wastes. Permits and identification numbers may be required for all categories with limited exceptions.*

#### Non-Hazardous Solid Wastes (40 CFR 257, 258)

Yes	No	Unknown	Will WESTON generate any non-hazardous solid wastes?
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#### Universal Wastes (40 CFR 273)

Yes	No	Unknown	Will WESTON, or the site generate any universal wastes?
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#### Hazardous Wastes Generation and Management (40 CFR 260-262)

Yes	No	Unknown	Will WESTON generate any hazardous wastes?
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Yes	No	Unknown	Will WESTON be responsible for managing hazardous wastes generated by the client?
Yes	No	Unknown	Will site activities result in quantities that result in Conditionally Exempt Small Quantity Generator (CESQG), Small Quantity Generator (SQG), or Large Quantity Generator (LQG).
Yes	No	Unknown	Has on-site accumulation of waste stream (areas, containers or other device) been evaluated?

#### **Hazardous Waste Treatment and Disposal Permit (40 CFR 264-270)**

Yes	No	Unknown	Will on-site treatment of waste(s) be conducted?
Yes	No	Unknown	If off-site disposal has TSDF been evaluated and accepted?
Yes	No	Unknown	Will the project involve clean-up of hazardous waste or hazardous waste constituents from a RCRA-regulated facility?

#### **Hazardous Waste Transportation (40 CFR 263)**

Yes	No	Unknown	Will WESTON be responsible for preparing hazardous wastes for transportation?
Yes	No	Unknown	If transportation of wastes has transporter been evaluated and accepted?
Yes	No	Unknown	Will WESTON sign manifest? As Generator? As "Agent" for client?

#### **Underground Storage Tanks (USTs) (40 CFR 280)**

Yes	No	Unknown	Will WESTON activities involve the installation, use, maintenance, spill or release clean-up, or decommissioning of a UST storing petroleum or CERCLA-listed hazardous substance?
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#### **Used Oil (40 CFR 279)**

Yes	No	Unknown	Will site activities involve the generation, storage or transportation of used/waste oil?
-----	----	---------	---

#### **Land Disposal Restrictions (40 CFR 268)**

Yes	No	Unknown	Will the project involve the generation of wastes meeting Land Disposal Restriction (LDR) criteria?
-----	----	---------	---

## State Requirements

*Most States have primacy for both hazardous and non-hazardous solid wastes, ensure knowledge of specific state requirements for above waste streams.*

### 3.5 Comprehensive Environmental Response Compensation and Liability Act (CERCLA)

#### General:

*The purpose of CERCLA is to provide a mechanism to clean up uncontrolled or abandoned contaminated sites and hold potentially responsible parties accountable for clean-up costs.*

#### Release Reporting (40 CFR 300, 302)

Yes	No	Unknown	Are any of the chemicals stored or used on site listed as a hazardous substance (40 CFR Part 302.4)?
Yes	No	Unknown	Is there a potential for an unpermitted release of a hazardous substance to the environment in excess of its 24-hour Reportable Quantity (RQ)?

#### Remediation Efforts (40 CFR 300)

Yes	No	Unknown	Are site remediation efforts under control of Federal Government?
Yes	No	Unknown	Are site remediation efforts under control of a State or Local Government?
Yes	No	Unknown	Are site remediation efforts under Private control?

## State Requirements

*Many states have enacted Superfund-type programs. Although many are similar to the Federal program, others may have significant differences to include broader ranges of hazardous substances.*

### 3.6 Emergency Planning and Community Right to Know (EPCRA)

*EPCRA established a process for developing state and local emergency planning and information programs on hazardous chemicals located at and/or emitted from facilities. Planning requirements apply to any facility that produces, uses or stores threshold quantities or more of any substance on the EPA list of extremely hazardous substances. There are also requirements for facilities that are required to maintain Material Safety Data Sheets to notify the local fire department of those materials.*

#### General:

Yes	No	Unknown	Will WESTON or WESTON subcontractor have chemicals on site?
-----	----	---------	---

**Emergency Planning Notifications (40 CFR 355)**

Yes	No	Unknown	Do any of the chemicals used or stored on site meet the definition of a hazardous substance and meet or exceed the threshold planning quantity (TPQ) for that chemical or 500 pounds, whichever is lower? (See 40 CFR Part 355 Appendix A and B). <i>If inventory meets criteria (material and quantity) then reports to LEPC, local Fire Department and SERC required. (See 40 CFR 370.21).</i>
-----	----	---------	---

**Emergency Release Notifications (40 CFR 370)**

Yes	No	Unknown	Is there the potential for a release of listed substances (see 40 CFR 355, Appendix A and B and 40 CFR 302) that could result in exposure to persons off-site?
-----	----	---------	--

**Community Right to Know/Hazardous Chemical Inventory Reporting (40 CFR 370)**

Yes	No	Unknown	At any point in time is any chemical requiring a MSDS in a quantity at or more than 10,000 pounds?
-----	----	---------	--

**State Requirements**

*There are specific reporting and documentation requirements under EPCRA for state and local entities.*

**3.7 Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)****General:**

*The purpose of FIFRA is to protect public health and the environment from the misuse of pesticides by regulating the labeling and registration of pesticides. In addition to data necessary for the registration of pesticides sold there are requirements for the certification of applicators of those pesticides listed as restricted use.*

**Labeling and Packaging Requirements (40 CFR 156, 157)**

Yes	No	Unknown	Does the project involve the use or application of pesticides?
-----	----	---------	--

**Certification of Applicators (40 CFR 171)**

Yes	No	Unknown	Is the use of a licensed pesticide applicator required (use of restricted use pesticides)?
-----	----	---------	--

**3.8 Toxic Substance Control Act (TSCA)(see also OSHA requirements)**

*Much of TSCA deals with the manufacture, use and distribution of chemicals in commerce with limited impact to WESTON. There are, however, management (to include remediation and disposal efforts) requirements for specific chemicals (most importantly lead-based paint, PCBs, and asbestos).*

**Lead-Based Paint (40 CFR 745)**

Yes	No	Unknown	Has the site been evaluated for the presence of lead or lead-containing materials?
-----	----	---------	--



Yes	No	Unknown	Will the project involve the removal of lead-contaminated materials?
-----	----	---------	--

**Polychlorinated Biphenyls (40 CFR 761)**

Yes	No	Unknown	Has the site been evaluated for the presence of PCBs or PCB-contamination?
Yes	No	Unknown	Will the project involve the removal or handling of PCBs?

**Asbestos (40 CFR 762)**

Yes	No	Unknown	Does the site or structures contain asbestos containing material (ACM)?
Yes	No	Unknown	Will the project involve the disruption or removal of ACM?

### 3.9 Natural Resources and the Endangered Species Act

*The Endangered Species Act (ESA) was passed to designate and protect those fish, wildlife and plant species that are endangered or threatened as well as designate critical habitat for those species. Compliance with ESA is required within the context of this checklist for not only necessary permits (e.g., Stormwater), but, as a means of understanding the potential environmental impact of our work efforts.*

**General:**

Yes	No	Unknown	Is the project site in an area identified as habitat for endangered, threatened or special interest species?
Yes	No	Unknown	Will the project result in a change in the diversity or numbers of any species of plants or animals?
Yes	No	Unknown	Will the project result in the reduction of numbers or habitat damage to any unique, rare, threatened or endangered species of plants or animals?
Yes	No	Unknown	Will the project result in the introduction of new species of plant or animal (including microbes, etc.)?
Yes	No	Unknown	Will the project result in any barrier(s) to the migration or movement of animals?
Yes	No	Unknown	Will the project result in any significant alteration, deterioration, or destruction of habitat?
Yes	No	Unknown	Will the project result in the alteration, destruction, or significant impact to any environmentally sensitive areas (e.g., wetlands, floodplains, critical habitat, prime farm land, coastal zones, etc.)?

*Note that a location-specific understanding of the ESA is necessary for completion of applications relating to air quality permitting, stormwater permitting and potentially others.*

### 3.10 National Environmental Policy Act

*The purpose of the National Environmental Policy Act (NEPA) is to encourage harmony between man and the environment, promote efforts to prevent or eliminate damage and stimulate the health and welfare of man, and to enrich the understanding of the ecological systems and natural resources that are important to the Nation. In context, NEPA requires federal agencies to prepare an environmental impact statement covering proposed actions that could significantly affect the quality of the human environment.*

**General:**

Yes	No	Unknown	Is the project a major Federal action, or project, or a project requiring a federal permit, receiving federal funds, or located on federal land? (NEPA)
-----	----	---------	---

### 3.11 Noise (see also OSHA requirements)

*The Noise Control Act promotes the policy that the environment is to be free of noise that jeopardizes health or welfare. While there are limited Federal/EPA regulations, there are State and Local regulations/ordinances that are applicable to work tasks.*

**General:**

Yes	No	Unknown	Will the project cause an increase in noise levels?
Yes	No	Unknown	Is the project site near sensitive receptor populations (e.g., residences, hospitals, schools, etc.)?
Yes	No	Unknown	Will site activities extend beyond typical daylight hours?
Yes	No	Unknown	Are there local noise ordinances in effect?
Yes	No	Unknown	Does the contract (or specifications) identify noise monitoring or other criteria?

### 3.12 Occupational Safety and Health (specifically 29 CFR 1910 and 1926)

*The overall goal of the Occupational Safety and Health Act (OSH Act) is to assure that employees are not adversely affected to hazards that they may be exposed to in the course of employment. All work activities conducted by WESTON must comply with applicable components of either the General Industry Standards, the Construction Standards, or the applicable requirements of Client-specific criteria, e.g., the Corps of Engineers.*

**General:**

Yes	No	Unknown	Will project activities be conducted under OSHA Construction Standards?
-----	----	---------	---

Yes	No	Unknown	Will project activities be conducted under OSHA General Industry Standards?
Yes	No	Unknown	Will project activities be conducted under the requirements of EM 385-1-1 (USACE)?
Yes	No	Unknown	Does the client have any specific occupational/safety requirements for the site work?
Yes	No	Unknown	Will project activities be conducted under other standards?

Based upon site activities, location and tasks follow all applicable criteria outline in WESTON's Safety and Health requirements guidelines.

### 3.13 Transportation (specifically 49 CFR Parts 171-179, 383, 390-399)

Transportation in the context of this checklist typically relates to the transportation of hazardous chemicals. The Department of Transportation (DOT) has specific regulatory requirements that must be met if WESTON either conducts or oversees the preparation for transport or actual transportation of hazardous chemicals/materials designated by DOT.

#### General:

Yes	No	Unknown	Will site activities involve the transportation (or storage incidental to transportation) of hazardous materials?
Yes	No	Unknown	Will WESTON personnel be transporting hazardous materials (in any amount)?
Yes	No	Unknown	Will WESTON personnel be operating vehicles meeting the definition of a commercial vehicle?
Yes	No	Unknown	Will WESTON personnel be operating vehicles transporting a hazardous material in a placarded amount?

### 3.14 Radiation

Various regulations under the auspices of the Nuclear Regulatory Agency (10 CFR) require specific procedures for the handling, training, storage and maintenance of nuclear materials.

#### General:

For the following questions indicated whether these tasks are by WESTON, Subcontractor, Client or Vendor.

Yes	No	Unknown	Will the project involve the transportation of radioactive material?
-----	----	---------	--

Yes	No	Unknown	Will the project involve the storage of radioactive material?
Yes	No	Unknown	Will the project involve the disposal of radioactive material?
Yes	No	Unknown	Will the project involve the use or storage of a radioactive source (e.g., troxler gauge, XRF)?
Yes	No	Unknown	Have users been properly trained, certified and are they operating under a radiation monitoring program?
Yes	No	Unknown	Have rad licenses been transferred and/or the client notified of the presence of rad sources?

*Based upon site activities, location and tasks follow all applicable criteria outline in WESTON's Safety and Health requirements guidelines.*

### **3.15 Historic/Archaeological**

*There are numerous Federal, State, Local and Tribal requirements outlining procedures to protect historic and cultural properties. These include those that exist as well as those that are discovered during work activities.*

Yes	No	Unknown	Is the site or project in an area that is of historic or archeological interest?
Yes	No	Unknown	Will the project result in alteration or destruction of an archeological or historical site, structure, object or building that is on or eligible for inclusion in the National Register of Historic Places?
Yes	No	Unknown	Will the project involve the excavation, altering, defacing, or removal of archaeological objects or resources or Native Indian graves, cairns, or glyptic records?

*Note that a location-specific understanding of historic and archaeological issues are necessary for completion of applications relating to air quality permitting, stormwater permitting and potentially others.*

**ATTACHMENT H**  
**TRAFFIC CONTROL PLAN**



**THIS SECTION NOT APPLICABLE**

**ATTACHMENT I  
AUDIT FORMS**





# MANAGER'S FIELD SITE HEALTH AND SAFETY AUDIT FORM

PM name: \_\_\_\_\_ Date: \_\_\_\_\_

Client name: \_\_\_\_\_ W.O. No.: \_\_\_\_\_

Site location: \_\_\_\_\_ Site phone no.: \_\_\_\_\_

Inspection conducted by:

\_\_\_ PM in person \_\_\_ PM via phone (Contact Name: \_\_\_\_\_)

\_\_\_ PM's designee (Designee's Name: \_\_\_\_\_)

1. Is the HASP available at the site? \_\_\_yes \_\_\_no Signed by all personnel? \_\_\_yes \_\_\_no  
(Have the cover page and site worker sign-off page faxed and attached to this form.)

2. What tasks are active? \_\_\_\_\_

3. What special H&S considerations are necessary? (e.g., confined spaces, fall protection, construction safety, excavation evaluations, radiation, etc.) \_\_\_\_\_

4A. List the name of the SHSC/FSO on Line (a) and any other employees working at the site on lines (b) through (i). Verify and check (✓) if field certifications are current:

Name	Weston or Sub?	Training	Medical	Fit Test
a.				
(For above, circle: SHSC or FSO)				
b.				
c.				
d.				
e.				
f.				
g.				
h.				
i.				

4B. For large projects, is documentation on-site for employee certifications? \_\_\_yes \_\_\_no \_\_\_NA

5. Is emergency contact information available on-site? \_\_\_yes \_\_\_no  
(Have a copy faxed from the site and attached to this report.)

6. Describe the ambient temperatures during recent work shifts: \_\_\_\_\_



## HEALTH AND SAFETY FIELD AUDIT

Legend X = Yes, O = No

SITE NAME: \_\_\_\_\_

WO #: \_\_\_\_\_

LOCATION: \_\_\_\_\_

INSPECTOR: \_\_\_\_\_

DATE: \_\_\_\_\_

### CERTIFICATION OF PERSONNEL:

1. \_\_\_\_\_ All WESTON personnel on site are currently active on certification list?
2. \_\_\_\_\_ Site Safety Officer and Site Supervisor are qualified?

### MEDICAL AND FIRST AID:

1. \_\_\_\_\_ First Aid Kits accessible and identified?
2. \_\_\_\_\_ Emergency eye/safety washes available?
3. \_\_\_\_\_ Daily First Aid logs up to date?
4. \_\_\_\_\_ First Aid Kits inspected weekly?
5. \_\_\_\_\_ At least two First Aid trained persons on site at all times when working?

### SITE SAFETY/EMERGENCY PLANS:

1. \_\_\_\_\_ Safety plan posted on site and given to each person?
2. \_\_\_\_\_ Initial site safety plan meeting held and documented before work begins?
3. \_\_\_\_\_ Hazardous materials information available for all hazards?
4. \_\_\_\_\_ Designated, qualified site health and safety coordinator on site?
5. \_\_\_\_\_ Employees trained in toxicology/exposure risks?
6. \_\_\_\_\_ Emergency telephone numbers posted?
7. \_\_\_\_\_ Emergency routes designated?
8. \_\_\_\_\_ Emergency plan and signal reviewed with all persons?

### TRAINING:

1. \_\_\_\_\_ Daily safety meetings documented?
2. \_\_\_\_\_ Question and answer time available to all site personnel?
3. \_\_\_\_\_ All employees instructed in hazardous materials handling practices?
4. \_\_\_\_\_ New personnel to site receive: copy of safety plan \_\_\_\_\_, site orientation \_\_\_\_\_, Review of:  
LOP \_\_\_\_\_, DECON \_\_\_\_\_, ZONES \_\_\_\_\_, Site specific safety and health hazards? \_\_\_\_\_

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## HEALTH AND SAFETY FIELD AUDIT - Continued

Legend X = Yes, O = No

### PERSONAL PROTECTION:

1. ☐ All equipment meets ANSI/OSHA/EPA criteria?
2. ☐ Levels of protection (LOP) established?
3. ☐ Site control zones (Exclusion, CRZ, Support) clearly designated?
4. ☐ All employees know their LOP scheme?
5. ☐ OSHA respirator program in place?
6. ☐ Employees fit tested for respirators?  

☐ On site?  
☐ Fit tests current?
7. ☐ Defective equipment tagged out?
8. ☐ Breathing air grade "D" certified?
9. ☐ Sufficient quantities of equipment?
10. ☐ Safety instrumentation maintained and calibrated?  

☐ Maint. & Cal. logs up to date?

### DECONTAMINATION:

1. ☐ Decon system set up on site?  

☐ Used?  
☐ According to safety plan?
2. ☐ Contamination reduction corridor clearly delineated within the CRZ?
3. ☐ Appropriate waste recepticals available for all waste?
4. ☐ Recepticals properly closed at end of day?
5. ☐ All Decon liquids properly contained and disposed of?
6. ☐ All wastes disposed of according to approved plan?
7. ☐ All personnel received Decon training?
8. ☐ All reusable personal protective gear deconned and disinfected at least daily?

### FIRE PREVENTION/PROTECTION:

1. ☐ Hot work permits required?
2. ☐ Smoking restricted to designated area?
3. ☐ Fire lanes established, clearly designated & maintained?
4. ☐ Flammable/combustible liquid dispensing transfer systems grounded & bonded?
5. ☐ Proper flammable materials storage?
6. ☐ Fire alarm established, workers aware?
7. ☐ Location and use of fire extinguisher known by all personnel?
8. ☐ Fire extinguishers checked before each shift?  

☐ Inspected monthly?
9. ☐ Fire extinguisher appropriate for fire hazard potential?
10. ☐ Combustible materials segregated from ignition sources?

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## HEALTH AND SAFETY FIELD AUDIT - Continued

Legend X = Yes, O = No

### WALKING AND WORKING SURFACES:

1. ☐ Accessways, stairs, ramps and ladders free of ice, mud, snow or debris?
2. ☐ Ladders exceed max length?
3. ☐ Ladders used in passageways, doors or driveways?
4. ☐ Broken or damaged ladders tagged out?
5. ☐ Metal ladders prohibited in electrical service?
6. ☐ Safety feet on straight and extension ladders?
7. ☐ Stairways, floor and wall openings guarded?
8. ☐ Elevated work areas guardrailed or safety chained?
9. ☐ Flotation devices worn when working on or over water?
10. ☐ Toe boards on overhead work surfaces?
11. ☐ Mobile offices/labs have fixed stairs and handrails?
12. ☐ Work areas kept free of debris and equipment?

### EXCAVATIONS, CONFINED SPACES, TUNNELS:

1. ☐ Excavations sloped, shored or benched to prevent cave-ins?
2. ☐ Shoring approved by engineer?
3. ☐ Guardrails or fences placed around excavations near walkways or roads?
4. ☐ Excavation locations lighted/or otherwise made visible at night?
5. ☐ Utility check performed and documented before excavation or drilling?
6. ☐ Ladders available in trenches more than 4 feet deep and at a minimum, 25' intervals along a fence?
7. ☐ All excavated material, personnel, heavy equipment is at least 24" from the edge of all trenches?
8. ☐ Confined space entry permit procedure in place and communicated to all?
9. ☐ Employee training includes CSE hazards?
10. ☐ Tunnels are adequately ventilated?
11. ☐ There is proper lighting?
12. ☐ Tunnel tested for: % O<sub>2</sub>?  
☐ LEL, flammable gases, vapors?  
☐ TOX?
13. ☐ Communication available inside to out?
14. ☐ No flammables or combustibles in tunnel?
15. ☐ CSE procedures used for Tunnels?
16. ☐ CSE procedure checklist:
  - ☐ Safety watch?
  - ☐ Safety watch protected same as enterers?
  - ☐ Safety line?
  - ☐ Appropriate harness?
  - ☐ Continuous monitoring for % O<sub>2</sub>, % LEL & TOX?

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## HEALTH AND SAFETY FIELD AUDIT - Continued

Legend X = Yes, O = No

### EXCAVATIONS, CONFINED SPACES, TUNNELS (continued):

- ☐ Level B or constant ventilation and monitoring?
- ☐ Instruments calibrated?
- ☐ Maintain and inspect log for all equipment?

17. ☐ Confined space isolated from electrical/mechanical activation by following lock out/tag out proceedings?  
☐ Confined space isolated from any raw materials/chemical lines by disconnecting or blanking these lines?

### MOTOR VEHICLES/HEAVY EQUIPMENT:

- 1. ☐ Inspected before each use?
- 2. ☐ Operators licensed for equipment used?
- 3. ☐ Unsafe equipment tagged out and reported?
- 4. ☐ All safety appliances/guards in place?
- 5. ☐ Shut down for fueling?
- 6. ☐ Equipped with back-up alarms or spotter used if 360° visibility restricted?
- 7. ☐ Loads are secure before transport?
- 8. ☐ Roads and structures inspected for load capacity per vehicle weights?
- 9. ☐ Riders prohibited on heavy equipment?

### SLINGS AND CHAINS:

- 1. ☐ Slings, chains and rigging rated for intended use and inspected per OSHA. Documentation of inspection in daily log?
- 2. ☐ Damaged slings, chains or rigging tagged out and reported?
- 3. ☐ Employees are instructed and keep clear of suspended loads?

### ELECTRICAL:

- 1. ☐ Warning signs indicate the presence and location of high voltage equipment, 250 V or greater present and location?
- 2. ☐ Electrical equipment and wiring properly guarded?
- 3. ☐ Electrical lines, extension cords and cables guarded and properly maintained?
- 4. ☐ Extension cords kept dry out of puddles and rain?
- 5. ☐ Damaged equipment tagged out?
- 6. ☐ Underground electrical lines located and indicated?
- 7. ☐ Overhead electrical lines de-energized or elevated work platforms, work areas, booms or ladders erected so no contact can occur with electrical lines?
- 8. ☐ A positive electrical lock-out system is used whenever work is done on or in electric equipment or electrically activated equipment?

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## HEALTH AND SAFETY FIELD AUDIT - Continued

Legend X = Yes, O = No

### HAND AND POWER TOOLS:

1. ☐ Guards and safety devices in place and used?
2. ☐ Inspected before each use?
3. ☐ Tagged out if defective?
4. ☐ Eye protection areas identified and protection worn?
5. ☐ Non sparking tools available?

### WELDING AND CUTTING:

1. ☐ Fire extinguishers present at all welding and cutting operations?
2. ☐ Confined spaces, tanks, pipelines tested before welding or cutting?
3. ☐ Hot work permitting system in use?
4. ☐ Proper helmets and shields (including proper tint for UV protection) used?
5. ☐ Properly grounded?
6. ☐ Fuel gas and O<sub>2</sub> gas cylinders stored at least 20' apart?  
☐ Stored upright and secured?
7. ☐ Only trained welders permitted?

### COMPRESSED GAS CYLINDERS/PRESSURIZED LINES:

1. ☐ Breathing air cylinders charged only to prescribed pressure?
2. ☐ No other gas system can be mistaken for breathing air?  
☐ Fittings prohibit cross connection?
3. ☐ Cylinders segregated appropriately in controlled, protected but well ventilated areas?
4. ☐ Smoking prohibited in storage areas?
5. ☐ Cylinders stored upright and secured?
6. ☐ Cylinder caps in place when stored (not in use) or when cylinders moved?
7. ☐ Fuel gas and O<sub>2</sub> minimum 20' apart when stored?
8. ☐ Pressurized air or waterlines are securely connected?
9. ☐ All site personnel know never to step across a pressurized line?
10. ☐ Gas or other hazardous lines are labelled appropriately?

### MISCELLANEOUS:

1. ☐ Tools and other equipment (portable) are stored away from walkways, roads or driveways where they cannot fall on or be fallen over by site personnel?
2. ☐ Overhead hazards are noted, communicated to all and labeled as needed?
3. ☐ Hard hat, eye hearing and protection areas are defined and signs in place?
4. ☐ Hard hats, eye and head protection used where appropriate?
5. ☐ Signs or labels are in place or appropriate training received?



### HEALTH AND SAFETY FIELD AUDIT - Continued

Legend X = Yes, O = No

6. \_\_\_\_\_ Copies of contracts with client and sub-contractors are on-site, WESTON's role regarding site health and safety responsibilities clear in these and in the minds of the site manager(s)?
7. \_\_\_\_\_ Sub-contractors have received approved copies of their safety plan or have signified their intent to conform with Weston's safety plan?
8. \_\_\_\_\_ Site managers understand their responsibilities for sub-contractors' conformance with all OSHA and other health and safety requirements?
9. \_\_\_\_\_ Site managers know what to do in the event of an OSHA inspection?

**COMMENTS:**

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

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